

Suicide Rates and Religious Commitment in Young Adult Males in Utah

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Previous studies have used population data to demonstrate an inverse association between suicide rates and religious commitment. This report examines Utah suicide rates for young men aged 15–34 years, stratified by their membership in and commitment to the Church of Jesus Christ of Latter-day Saints (LDS), the predominant religion in Utah. All state death records for males from 1991 to 1995 were obtained and linked to LDS church deceased membership records to obtain a measure of religious commitment that is not self-reported. Religious commitment for LDS church members was determined by age-appropriate priesthood office. Of the 27,738 male deaths reported, 15,555 (56%) linked to an LDS church record using a probabilistic linking program. Using *active* (high religious commitment) LDS as the reference group, the *less-active* (low religious commitment) LDS group had relative risks of suicide ranging from 3.28 (ages 15–19 years) to 7.64 (ages 25–29 years); nonmembers of the LDS church had relative risks ranging from 3.43 (ages 15–19 years) to 6.27 (ages 20–24 years). Although the mechanism of the association is unclear, higher levels of religiosity appear to be inversely associated with suicide. *Am J Epidemiol* 2002;155:413–19.

adolescence; religion; risk factors; suicide

In 1996, suicide was the third leading cause of death for US males aged 15–24 years and the fourth leading cause of death for US males aged 25–44 (1). In Utah, for 1991–1995, suicide was the second leading cause of death for males aged 15–24 years and the leading cause of death for males aged 25–44 (2). For more than a decade, suicide rates in Utah for young males aged 15–34 years have been substantially higher than national suicide rates (3, 4). Although a number of risk factors for suicide have been suggested, a low level of religious commitment or religiosity is a potential risk factor that merits further study.

Low levels of religiosity as a potential risk factor for suicide appeared in the literature as early as 1968 when Kranitz et al. (5) reported that, for a sample of 20 suicide attempters and 20 controls, suicide attempters were significantly less active in church activities than were nonattempters. Using a 1963 census of Washington County, Maryland, Comstock and Partridge (6) reported in 1972 that persons who usually attended church less than once a week had a relative risk of suicide of 2.1 compared with persons who usually attended church one or more times per week. In a later analysis of these data, Comstock and Tonascia (7) found no inverse

association between frequency of church attendance and total mortality during the seventh and eighth years of observation; therefore, they concluded that the inverse association between church attendance and total mortality that was seen in the early years of observation was most likely due to chronically ill persons attending church infrequently. However, they did not report reanalyzing the data to examine the previously observed relation between church attendance and suicide.

In the early 1980s, a handful of studies using population data considered the association between suicide rates and religious commitment; however, their methods and results were varied. Using age- and gender-specific suicide rates from 25 nations and the number of religious books as a percentage of total national book production, Stack (8) reported a moderately significant negative association between suicide and religiosity for most female age groups, but no significant association for males. Using national suicide rates and the number of religious books as a percentage of total national book production from 42 nations, Breault and Barkey (9) reported a significant negative, nonlinear association between suicide and religiosity. Stark et al. (10) also found a significant negative correlation between suicide rates and the percentage of the population belonging to a church using US Standard Metropolitan Statistical Areas as the unit of analysis. However, neither Breault and Barkey (9) nor Stark et al. (10) used age- and gender-specific data. Martin (11) reported significant negative correlations between US annual suicide rates from 1972 to 1978 and average annual church attendance for both genders and for both Blacks and Whites. However, using age- and gender-specific US annual suicide rates from 1954 to 1978, Stack (12) reported significant negative associations only for males aged 15–49 years.

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Abbreviations: ICD-9, *International Classification of Diseases*, Ninth Revision; LDS, Latter-day Saints.

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While this literature suggests that religious commitment is protective for suicide, no clear picture has emerged. Most empiric studies to date have used population data that introduce the risk of ecologic fallacy and limit their usefulness for determining risk factors for suicide (13). In addition, aggregate measures of religiosity used in population-based studies are only gross measures of religious commitment. Kranitz et al. (5) and Comstock and Partridge (6) used individual data, but their studies did not stratify by age and gender, and their measures of religiosity are self-reported. Finally, few research studies to date have examined suicide in young adults, and it is unclear whether results from research studies on suicide in older persons apply to younger persons (14).

The purpose of this paper is to investigate whether or not religious commitment is protective for suicide among young males. We report age-specific suicide rates for young males in Utah aged 15–34 years for the period 1991–1995 that are stratified by membership and activity in the Church of Jesus Christ of Latter-day Saints (LDS), the predominant religion in Utah. These data represent a unique opportunity to examine the relation between religious commitment and suicide risk using individual data from a large population. More important, these data allow us to examine this relation in young males who are a subpopulation at high risk of suicide and for whom results from population-based studies have been mixed.

MATERIALS AND METHODS

Description of data

Data used in this study come from three sources: the Utah State Department of Health, the LDS church, and the US Census Bureau. All state death records from 1991 to 1995 were obtained from the Utah State Department of Health. These records contain name, gender, date of birth, date of death, county of death, and cause of death coded using the *International Classification of Diseases*, Ninth Revision (ICD-9) classification codes. We obtained LDS church membership records for all church members residing in Utah for whom the church had a record of death between 1991 and 1995. LDS church records were used to extract an individual measure of religious commitment that was not self-reported. Annual LDS church census estimates for Utah were used as the denominators in the LDS-stratified suicide rates. Denominators for the nonmember LDS rates were based upon the difference between the US Census Bureau annual state population estimates and the LDS church census estimates.

Reliability of records

All deaths classified with ICD-9 codes E950–E959 were considered to be suicide. Utah has had a medical examiner system in place since 1967. All accidental and/or unattended deaths are investigated, and the medical examiner fills out the death certificate stating cause of death; therefore, there is little chance of bias in the reporting of suicide deaths for any of the subgroups.

The US Census Bureau estimates annual age- and gender-specific population numbers for each state. Details of their estimation methods are described in their published documents (15). Although there is variability in these population estimates, no estimates of modeling or of sampling variability are published.

The LDS record-keeping system is highly accurate (16). Each LDS church congregation creates and maintains a record for each member. These records are added to a general church member database and contain minimal information, including name, date of birth, parents' names, current address, and dates of church ordinances (e.g., baptism, priesthood ordination, and marriage). Records are updated periodically to include dates of ordinances, name of spouse, changes of address, and date of death. Each member has an annual opportunity to review his or her membership record to check it for accuracy; therefore, the information available from the church records is quite reliable, especially for members who are actively involved in the church. When a member dies, the membership record is updated and then archived in the church's deceased membership database.

Linking records from two data sources

To calculate age-specific suicide rates stratified by LDS church membership and activity, records from the state and the LDS church needed to be linked; however, these records do not share a common unique identifier. We used the probabilistic linking program LinkPro (17) to link records from these two sources. This program calculates probabilities to determine whether a pair of records refers to the same person. To calculate these probabilities, we used 11 identifying characteristics that were common to the two data sets: full name (first, middle, last), birth date (day, month, year), marital status, county of death, and SOUNDEx versions of the three names. Records that matched on at least seven of the 11 variables, one of which was required to be the SOUNDEx version of the last name, were considered to be linked. Ambiguous links, which were relatively few, were hand coded.

An age-stratified random sample was taken of state death records that did not link to a church record; added to this sample were all unlinked state death records with cause-of-death codes E950–E959 between ages 15 and 34 years. Information from these death records was sent to the Membership and Records Department of the LDS Church, where church personnel checked this information against membership records of living members. Records were considered linked if the full name and birth date were the same.

There were 27,738 male deaths reported in the state of Utah for the time period 1991–1995. Using the protocol described above, 15,555 of the 16,498 (94.3 percent) LDS male deceased membership records linked to a state death record. This percentage of linked records is comparable with linkage results between two data sets with a common unique identifier, such as a Social Security number (18). Of the 1,028 state death records that were checked by church personnel, 200 (19.5 percent) matched an LDS membership record. State death records that did not link to an LDS church record were classified as nonmembers.

There were 551 suicides in Utah for males aged 15–34 years from 1991 to 1995. Of these 551 suicides, 273 were linked to an LDS membership record by using the probabilistic linking program, and 56 were linked to an LDS record by church personnel; therefore, 329 (59.7 percent) linked to an LDS membership record.

Measure of religious commitment

The measure of religious commitment used in this study is level of activity in the LDS church. “Active” in this context means adhering to church doctrines and practices; “less active” means not adhering to church doctrines and practices. Although LDS membership records contain no direct measure of church activity, a surrogate measure of activity that is clearly defined and not self-reported can be derived from church membership records for males by using age-appropriate priesthood office (19).

To understand this measure of religiosity, one must understand the following with regard to priesthood office in the LDS church. All active male members of the LDS church are given the Aaronic priesthood and ordained to the office of deacon at age 12 years. Advancement to the offices of teacher and priest within the Aaronic priesthood occurs for active male members at ages 14 and 16 years, respectively. At age 18 years, all active male members are eligible to receive the Melchizedek priesthood and typically receive this priesthood by age 20. Because church membership records contain information regarding age and current priesthood office, we are able to classify male members as active or less active in the LDS church. Specific classification rules can be found in table 1.

It is important to note that age-appropriate priesthood office is different from church attendance and completely unrelated to any health condition. As noted by Gardner and Lyon (19), ordination to priesthood office is dependent upon obedience to and acceptance of church doctrines and practices. A partial list of such practices includes honesty; moral cleanliness; payment of tithes; abstention from the use of alcohol, tobacco, coffee, tea, and illegal drugs; and attendance at church meetings. Although attendance at church meetings is included on this list, the church has no set

requirement for what constitutes adequate church attendance. Adequate church attendance and advancement in the priesthood are determined on an individual basis through an interview between the person and the ecclesiastic leader of the congregation. Therefore, persons with depression or any other health condition who are faithful and obedient to church doctrines but who are unable to attend church regularly due to their illness would still advance in the priesthood.

RESULTS

Age-specific suicide rates per 100,000 stratified by LDS church membership and activity for the 5-year period 1991–1995 are found in table 2. For each of the four age groups in this study, active LDS rates are lower than those for less active LDS, nonmember, and US rates. For the age group 15–19 years, the nonmember rate is comparable with the less active LDS rate; for the age group 20–24, the nonmember rate is higher than the less active LDS rate; and for the older two age groups, the nonmember rate falls between the active and the less active LDS rates.

Relative risks of suicide using the active LDS group as the reference group with 95 percent confidence intervals are found in table 3. The relative risks of less active LDS to active LDS range from 3.28 for the age group 15–19 years to 7.64 for the age group 25–29, and none of the 95 percent confidence intervals contain one. Relative risks of nonmembers to active LDS range from 3.43 to 6.27, and none of the 95 percent confidence intervals include one. Finally, the risk of suicide is 2.5 to 3 times greater for US males aged 20–34 years than it is for active LDS males of comparable age. For young men aged 15–19 years, the risk

TABLE 1. Rules used to classify LDS* male church members according to level of religious commitment, Utah, 1991–1995

Age (years)	Active LDS	Less-active LDS
15–16	Teacher or priest in Aaronic priesthood	Deacon in Aaronic priesthood or no priesthood office
17–19	Priest in Aaronic priesthood or elder in Melchizedek priesthood	Teacher or deacon in Aaronic priesthood or no priesthood office
20–35	Elder or high priest in Melchizedek priesthood	Any office in Aaronic priesthood or no priesthood

* LDS, Latter-day Saints.

TABLE 2. Age-specific suicide rates for Utah males stratified by religious affiliation and religious commitment for 1991–1995*

Age group (years)	No. of suicides in Utah	Utah male suicide rate per 100,000	US male suicide rate per 100,000
15–19	156	34.45	17.44
Active LDS†	46	17.40	
Less-active LDS	55	57.11	
Nonmember	55	59.69	
20–24	158	39.83	27.69
Active LDS	20	11.19	
Less-active LDS	72	58.16	
Nonmember	66	70.12	
25–29	118	32.67	25.70
Active LDS	13	8.58	
Less-active LDS	57	65.55	
Nonmember	48	39.14	
30–34	119	33.58	25.54
Active LDS	16	10.85	
Less-active LDS	50	60.56	
Nonmember	53	42.63	

* Suicide rates for US males are included for this time period as a point of reference.

† LDS, Latter-day Saints.

TABLE 3. Age-specific relative risks of suicide and 95% confidence intervals for Utah males, stratified by religious affiliation and religious activity for 1991–1995*

Age group (years)	Relative risk of suicide	95% CI†
15–19		
Active LDS	1.00	
Less-active LDS	3.28	2.22, 4.85
Nonmember	3.43	2.32, 5.07
US male	1.00	
20–24		
Active LDS	1.00	
Less-active LDS	5.20	3.17, 8.54
Nonmember	6.27	3.80, 10.34
US male	2.47	
25–29		
Active LDS	1.00	
Less-active LDS	7.64	4.18, 13.95
Nonmember	4.56	2.47, 8.41
US male	3.00	
30–34		
Active LDS	1.00	
Less-active LDS	5.58	3.18, 9.80
Nonmember	3.93	2.25, 6.88
US male	2.35	

* Active Latter-day Saints (LDS) is the reference group for relative risk.

† CI, confidence interval.

of suicide for active LDS males is comparable with the total US male risk.

Age-specific, annual suicide rates for active and less active LDS members, nonmembers, and US males are found in figure 1. In general, results for the annual rates are similar to those for the 5-year rates. For the active LDS group, the annual rates are relatively stable and are almost always lower than those for the less active, nonmember, and US rates. The one exception was in the age group 15–19 years, in which the active LDS and US rates are comparable. Annual rates for the less active LDS are the most variable of the three groups, especially for the age groups 20–24 and 25–29 years. For the two older age groups, the nonmember annual rates are consistently between the active and less active LDS rates.

DISCUSSION

For all age groups considered in this study, the less active LDS group had higher suicide rates than the active LDS group, with relative risks ranging from three to seven, and none of the 95 percent confidence intervals included one. Comparisons between these two groups are a clear comparison between groups who differ in terms of religious commitment to their church; therefore, these results provide evidence that a low level of religious commitment is a potential risk factor for suicide. Results from this study are consistent with those from a similarly designed study using data from 1975–1979. Fellingham et al. (20) reported an

age-adjusted suicide rate ratio between less active and active LDS young men aged 15–34 years in Utah of 4.27. The fact that the observed association between suicide and low levels of religiosity has remained consistent within this population over a 20-year period lends credence to its validity.

Nonmembers of the LDS church in Utah and the total US population represent groups whose members have varying levels of religious commitment. If a low level of religiosity is a risk factor for suicide and all else were equal between these groups (which it is not), we would expect relative risks for these two groups of mixed religious commitment to be greater than one when compared with the active LDS group. With the exception of the age group 15–19 years, this was observed; therefore, active LDS males aged 20–34 years are at decreased risk of suicide compared with their Utah and US counterparts, and active LDS males aged 15–19 are at decreased risk of suicide compared with their Utah counterparts.

We would also expect relative risks for nonmembers and the total US population to be smaller than those for the less active LDS group. This is precisely what we observe in the two older age groups, but only partially in the younger two age groups. The relative risks for the total US population are smaller than those for less active LDS for all age groups; however, the relative risks for nonmembers are smaller than the less active LDS for the two older age groups only. For the age groups 15–19 and 20–24 years, the relative risks for nonmembers are slightly higher than those for less active LDS. However, the 95 percent confidence intervals for the relative risks of the less active LDS and nonmembers overlap for all age groups.

A potential limitation of this study is the possible misclassification of persons in the three religious groups. The potential for misclassifying someone who was a member of the LDS church as a nonmember is quite small. Since all suicides that did not link with an LDS church record from the deceased membership files using the probabilistic linking program were checked against church membership records of living members, we are confident that those persons identified as nonmembers are correctly classified.

There is potential for misclassifying the religious commitment of LDS members. As stated previously, LDS church records do not contain a direct measure of religious commitment; rather, we derived a surrogate measure of commitment based upon age-appropriate advancement in the priesthood. Given our classification rules and the practice of the LDS church to ordain all active young men to the priesthood, there is only potential for misclassifying less active members as active, but not vice versa. For male members aged 12–21 years, our surrogate measure of activity is a good measure of religious commitment due to the priesthood ordination process described previously; however, this surrogate measure is less accurate for male members older than age 21 years. For example, it is possible for a young man to be ordained an elder at age 19 years and by age 30 to have become less committed to the church. Under our current classification, such a person would be classified as active when he is truly less active. Therefore, this type of misclassification would underesti-

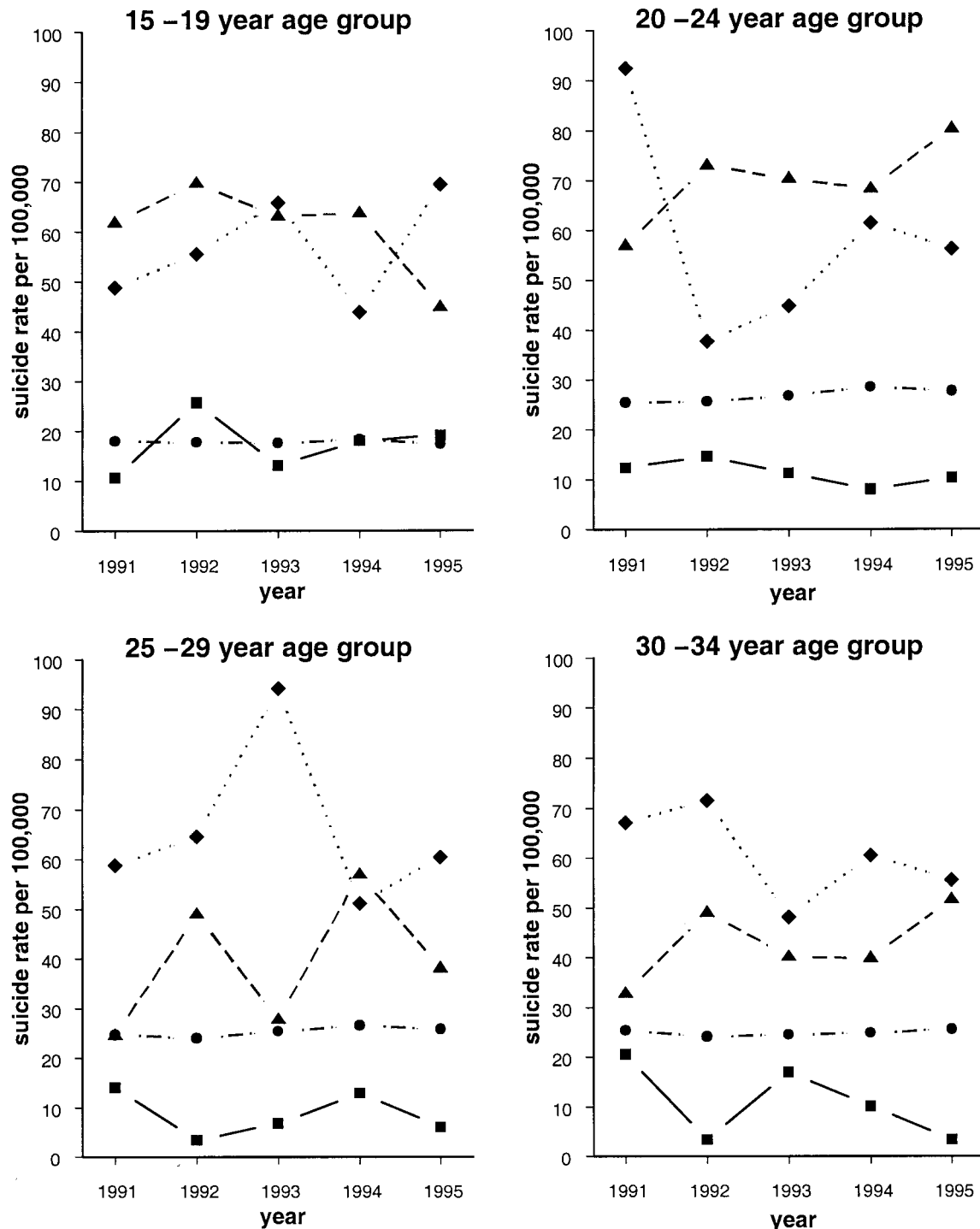


FIGURE 1. Annual suicide rates (1991–1995) per 1,090,000 persons for the following four groups: 1) Utah males active in Latter-day Saints (LDS) church (■), 2) Utah males less active in LDS church (◆), 3) Utah males not members of LDS church (▲), and 4) US males (●).

mate the relative risk of suicide for the less active LDS compared with the active LDS.

Some have suggested that death certificate information may underrepresent suicide mortality (9, 21). Others, however, have concluded that there is little systematic bias in the

reporting of suicide (22, 23). If such underreporting exists, then the reported suicide rates in table 2 would be biased downward. Nevertheless, we find no reason to expect the underreporting bias to be different for the three subgroups, given the existence of the medical examiner system and

since there is no punitive religious action imposed on LDS suicide victims. Therefore, the estimated relative risks in table 3 would be unaffected by any underreporting.

A limitation of this study is that we do not have data to control for accepted risk factors for suicide, such as depression and substance abuse; therefore, these risk factors could be confounding variables that might eliminate the observed association between suicide and religiosity if they were controlled for in the analysis. This limitation warrants careful discussion.

First, as pointed out in Materials and Methods, it is difficult to argue that depression is associated with priesthood advancement. In addition, there is no evidence in the literature that suggests an association between depression and religiosity in LDS males; therefore, it is extremely unlikely that depression is a confounding variable in this study. On the other hand, abstinence from both alcohol and illicit drugs is required for priesthood advancement; therefore, substance abuse is confounded with our measure of religiosity.

It is widely acknowledged in the literature that substance abuse (both alcoholism and drug abuse) is a major risk factor for suicide (24, 25). However, it is very difficult to find research that quantifies this risk. Crumley (26), in a review of literature, offers several reasons for this: 1) most studies of suicide do not have a control group; 2) most studies of suicide have subjects from very select subpopulations (e.g., psychiatric inpatients) that make it difficult to generalize findings; and 3) there is no standard definition of substance abuse.

Two studies did report estimates of the association between substance abuse and suicide that used community controls and focused on completed suicides in males under age 20 years. Brent et al. (27) reported an odds ratio of 3.3 for alcohol abuse and an odds ratio of 5.0 for drug abuse after controlling for comorbid affective disorders. Shaffer et al. (28) reported an odds ratio of 5.8 for alcohol abuse; however, they did not control for any comorbid affective disorders. Therefore, since there is an acknowledged high coincidence of alcohol abuse and affective disorders in suicide victims (24, 28), the odds ratio in the report by Shaffer et al. probably overestimates the risk of alcohol abuse. These odd ratios, however, are fairly comparable with the relative risk we report for less active LDS in the age group 15–19 years.

We found no research findings that quantified the risk of substance abuse in young adult males aged 20–35 years. However, if the magnitude of the association between substance abuse and suicide for these ages is similar to that reported for males less than age 20 years, then there is some evidence in our results of excess risk of suicide for these ages since the less active LDS have relative risks of suicide ranging from 5.2 to 7.6.

There are several reasons why high levels of religiosity may prevent suicide in young adult males. First, some religions proscribe harmful health behaviors, such as substance abuse; therefore, if substance abuse is directly associated with suicide, high levels of religiosity could have an indirect preventive effect on suicide through the proscription of substance abuse. Second, many religions provide a social structure that results in relatively high levels of social support

and integration. This social support may reduce feelings of isolation and anomie, as well as offer support during bouts of depression. If feelings of isolation, anomie, and depression are directly associated with suicide, active participation in a religion could have an indirect preventive effect on suicide. Similar social support and integration arguments could be made for another potential risk factor for suicide that has been suggested in the literature: downward occupational (economic) mobility (29). Finally, most religions place a high value on life and espouse a belief in the sanctity of life; therefore, a strong commitment to religious teachings would reinforce and strengthen a person's innate desire to live and have a direct preventive effect on suicide.

Although substance abuse is confounded with our measure of religiosity, it is impossible to assess the degree of their confounding with the data at hand. For the reasons stated above, we believe that some, but not all, of the increased risk in suicide for less active LDS is attributable to higher levels of substance abuse. For those who disagree with this assessment, our findings are still relevant due to the dearth of sound epidemiologic literature that *quantifies* the risk of substance abuse on suicide in young adult males aged 15–35 years. If our measure of religiosity is simply a surrogate for substance abuse, then we believe our findings quantify this risk and most likely underestimate this risk for the two older age groups since our measure of religiosity is less reliable in distinguishing between active and less active LDS males for these age groups.

In summary, active LDS males aged 15–34 years are at decreased risk of suicide compared with their Utah counterparts, both less active and non-LDS. In addition, active LDS males aged 20–34 years are at decreased risk of suicide compared with their US counterparts. We believe that the inverse association between high levels of religiosity and suicide is relatively unexplored, yet ecologic studies and our own research indicate that it is real. In fact, since individual data are used and our measure of religiosity is not self-reported, our findings represent stronger evidence than previously published research in support of the hypothesis that religious involvement is protective against suicide.

Further investigation of the association between religiosity and suicide is warranted. Specifically, it is important to study this association in other religious populations. Since the reasons for expecting an inverse relation between high religiosity and suicide are not unique to the LDS religion, we would expect similar results in religions that proscribe substance abuse, but we would expect attenuated results in religions that do not. It is also important to study and quantify this association in females and older males. Finally, it is important to investigate and quantify both the direct and indirect effects that religiosity has on suicide. Nevertheless, paraphrasing Comstock and Partridge (6), we suggest that even if the mechanism of the association is not understood between religiosity and suicide, low religiosity is an attribute that could be used to identify a group that has an increased risk of suicide. Insofar that risk and protective factors for suicide are identified and quantified, public health efforts to reduce suicide have an increased likelihood of being effective.

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