Child mortality and religious affiliation by ethnicity in Chiapas, Mexico

ABSTRACT

A considerable number of indigenous people in Mexico have converted to Protestant religions in recent years. Religious affiliation and religious conversion have been associated with health status in other populations. In this analysis we investigate whether there is a statistical relationship between religious affiliation and child mortality within indigenous and non-indigenous groups in Chiapas, Mexico. Our analysis includes Brass-type estimates for child mortality and multivariate analysis that comprises various socioeconomic and demographic factors that may account for this association. The data came from the 10% sample of the 2000 Mexican Census (INEGI, 2000). Our findings indicate that among indigenous people, Historical Protestants and Pentecostal-Evangelicals have lower rates of child mortality than Catholics. However, we did not find significant differentials in child mortality by religious affiliation among non-indigenous people. The social and cultural transformations that tend to accompany religious conversion may have an impact on the health of disadvantaged populations such as the indigenous people in Chiapas.

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Despite substantial improvements in child survival, the population of Chiapas continues to exhibit higher child and infant mortality rates compared to the rest of Mexico. While the infant mortality rate decreased in Chiapas from 45.8 per thousand in 1990 to 31.9 in 2000,[1] child mortality fell from 77 per thousand in 1990 to 36.4 in 1997.[2] Increased vaccination coverage and gains in literacy rates have been credited for these declines in mortality.[2] However, both the infant mortality rate and the child mortality rate are still above average Mexican mortality rates by 28 percent and 25 percent respectively[1,2]. Additional gains in child survival may require higher standards of living, better access to health care, and abatement of current disparities in marginalization and literacy between indigenous and non-indigenous Chiapanecan populations.[3]

The religious landscape in Chiapas is characterized by a high and increasing proportion of Protestants[1] and people claiming no affiliation. In the last three decades, the percentage of non-Catholics increased from 5.2 to 22.0, while the percentage of individuals with no religious affiliation, from 3.5 to 13.1.[4] These transformations in religious adscription in Chiapas have been linked to an increasingly market-oriented economy. Among the consequences of modernization that have affected religious affiliation are changes in lifestyles, values and customs,[5,6] the collapse of the system of cargos among indigenous populations, [7,8] and modification in religious cycles as a result of changes in agricultural cycles.[7] Thus, in a context of liberalization of markets for production, land and work force, non-Catholic congregations are viewed as religions that may fit better with the new economic activities, react against the traditional political system, and/or facilitate communitarian cohesion.

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[1] In this paper we use "Protestants" to name non-Catholic religions included under the Historical, Pentecostal or Evangelical, and Biblical Non-Evangelical umbrellas.

Protestantism has expanded even more among the poorest sectors of society such as indigenous populations.[9] In 2000, 32 percent of indigenous people in Chiapas were affiliated with non-Catholic religions, compared to 19 percent among non-indigenous populations. Conversions to these religions have taken place mainly from a Catholicism that is distinguished from Roman Catholicism by the influence of traditional pre-Hispanic beliefs and little knowledge about papal ordinances.[6-8,10] The most popular Protestant churches in Chiapas have been Presbyterian, Pentecostal and Adventist. In general, followers of these religions are more likely to live in rural areas and speak an indigenous language, and to have less formal education, lower employment rates and higher poverty than Catholics.[4]

Although socioeconomic disadvantages typify Protestant populations, changes in lifestyle and gains in social and cultural capital as a result of conversion may buffer the impact of poverty on health.[10,11] Anthropological studies have suggested that Protestantism may help people cope with economic and social instability.[12,13] Adscription to this kind of religion can offer spiritual, social and, on occasion, material support through the formation or expansion of networks that go beyond kinship.[6,10,12,14] Also, it can contribute to re-orient patterns of consumption toward the needs of the family and housing improvements, since people stop spending money on alcohol and saint festivities.[6,9,14]

Furthermore, Protestantism may also result in a reduction in domestic violence as men quit drinking alcohol, which is a key social problem among indigenous societies.[6,14,15] Men are expected to consider looking after their family and church well-being as a personal goal.[6,16] Additionally, women can be empowered through their active participation in the church and the expansion of social networks.[14,16]

There are other benefits associated with conversion to Protestantism. As part of their social mission these churches promote literacy as a means to understand their sacred books and awake

people to the relevance of hygiene and preventive health care on physical well-being and of the properties of western medicine.[6,10] Presbyterians, for example, train indigenous health promoters among Tzotziles, Tzeltales and Choles to offer basic health care and health education in their own communities and to direct individuals with more serious health problems to seek medical services in the health institutions funded by the government.[17,18,19]

The study of child mortality differentials among the different religious groups in Mexico is only in its initial stages. Recent research on birth outcomes in Chiapas [20] found that, among a nonrandom sample of rural communities within the zones most affected by the Zapatista conflict, political or religious discrimination in health care provision were associated with higher maternal and/or perinatal mortality. However, it is not clear whether religion per se was associated with these mortality outcomes.

International literature has paid attention to the effect of religious affiliation on child mortality.[21-24] Differentials have been attributed mainly to differences in socioeconomic characteristics and lifestyle among religious groups. From a historical perspective, children of Protestants have evidenced greater survival than children of Catholics in Germany due to a greater reliance in family planning, obstetric care, hygiene and maternal education.[21] This association has also been reported in Holland, where the lower mortality observed in some religious groups has been explained as the result of their social segregation.[22]

Finally, some authors have studied the link between child mortality and religious affiliation in the Brazilian population.[23,24] In the Northeast, the poorest region of the country, Protestant women reported lower child mortality than Catholics net of the effect of socioeconomic factors; and among Protestants, Historical Protestants had a greater effect on child survival than Pentecostals.[23] However, in Rio de Janeiro child mortality rates did not vary by religious affiliation after controlling for socioeconomic variables.[24]

The analysis presented here assesses the linkage between religious affiliation and child mortality based on the hypothesis that the social and cultural transformations that come with Protestantism offset gender inequalities, social isolation and ignorance about health care that affect the health of indigenous women and children.[25,26,27] We present Brass-type estimates of the probability of child mortality separately by ethnicity and religious affiliation. We then include multivariate analysis to evaluate the statistical relationship between religious affiliation and child mortality among indigenous and non-indigenous women, net of the effect of socioeconomic covariates.

The next section introduces the data and methods used, our results are presented in the following section, and the last section deals with a discussion of our findings.

Data and Methods

The data used in this analysis come from the 10 percent sample of the 2000 Mexican census.[28] These data provide information about the number of children ever born (CEB) and surviving children (SCEB) for women age 12 and older, their religious affiliation and socioeconomic characteristics of interest for our analysis such as indigenous language, bilingualism, schooling, housing conditions, region and size of place of residence, use of health services and participation in government-sponsored development programs.

The dataset for the analysis contains information on 115,516 women aged 15-49 residing in Chiapas. The sub-sample sizes are specified within each table shown in the results section (the sample size changes according to the sub-populations and to the variables used due to missing values).

Ethnicity is coded as either indigenous or non-indigenous and is based on self-reported ability to speak a native language. We use the linguistic criterion instead of their self-reported membership to an indigenous group, which is also available in the census survey, because regardless of this

membership the cultural background of women who speak an indigenous language may be associated with socioeconomic and lifestyle characteristics that could affect child survival. In addition, while knowledge of a dialect may be underreported for fear of ethnic discrimination[29] or other reasons, we found that the ethnicity variable has a higher proportion of missing values than the variable for dialect. Previous researchers have identified indigenous populations by the language of the household head, the most common language spoken in the municipality or a combination of ethnic self-identification and language.[29] Although replicating any of these approaches may increase the number of indigenous people in our analysis, the reliability of these methods is still under debate.

We follow INEGI's classification of religious affiliation. Protestant religions more directly related to the Protestant Reformation are grouped as Historical Protestants. The category Pentecostal-Evangelical comprises Pentecostals (including Neo-Pentecostals and groups of Pentecostal roots) and Evangelicals[2]. Biblical non-Evangelical groups and those who declared no affiliation with any religion are considered separately. People with no religious affiliation might be non believers or practitioners of traditional indigenous spirituality, or possibly, might deny their religious affiliation to avoid conflicts.[30] Other non-Christian and non-specified religions are excluded from the analysis due to their small numbers.

Literacy and years of schooling are combined to create the following educational categories: illiterate women and those with no formal schooling; women who did not complete primary school (1-5 years); those who completed grade school but did not complete secondary school (6-8 years); and those with secondary or higher level of education (9 years or more).

Size of place of residence is classified into rural areas (fewer than 2,500 inhabitants) and urban areas (over 2,500 inhabitants). A dichotomous variable for floors (dirt or not dirt) in the household

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2   We placed Evangelicals within this category because in Chiapas they have fewer members than Pentecostals and those identified as "Christians" and "Evangelicals" could be Pentecostals or Neo-Pentecostals. [28]

is used as a proxy for household infrastructure. Another dichotomous variable indicates whether the woman participated in *Progresa* or *Procampo*. *Progresa,* now *Oportunidades,* is a development program based on conditional cash transfers that target the poor in Mexico,[31] while *Procampo* supports agricultural production in selected crops.[32]

Women are also coded as users or non-users of health services. Users are further categorized by the place where they seek medical care: Instituto Mexicano del Seguro Social (IMSS), Instituto de Salud y Seguridad Social de los Trabajadores del Estado (ISSSTE) or "private-other" category. Users of Centro de Salud of the Secretaria de Salubridad y Asistencia (SSA) and IMSS-Solidaridad are considered separately, since these services target mainly uninsured indigent and rural sectors of society.

Region of residence is utilized as a proxy for the economic, cultural and social diversity among indigenous settlements. Only regions with over 40 percent indigenous populations are coded separately (Norte, Altos and Selva).[33] The rest of the regions are grouped in a residual category.

Not surprisingly, most municipalities in the selected regions present very high indexes of marginalization.[34] However, each of these regions comprises a particular population history. The colonial capital, which is still an administrative, economic and religious center, is located in Altos (Highlands). Here Tzotzil and Tzeltal are the most important ethnic groups and their rapid population growth have put high pressure over the land, which combined with political and religious conflicts, have lead to repeated expulsions.[35] As a result, Norte (North) that was originally populated by Choles and Zoques, now is predominantly inhabited by Tzotziles. Lastly, although Selva (Rainforest) for centuries was populated by Lacandones, since the 60's has been constituted mostly by Tzeltal and Choles, whose communities have been characterized by high levels of social cohesion and organization[36].

To estimate the probability of child mortality q(x) by maternal religious affiliation and language, we first apply the Brass' method.[37] This method is derived from the observation of a linkage between maternal age pattern of fertility and the distribution of the length of children's exposure to the risk of dying. We use the adjustment factors developed by Trussel for the West model to reduce estimation errors.[38]

In the second part of our analysis, we further explore the relationship between child mortality and religious affiliation among indigenous and non-indigenous women using negative binomial regression models. The dependent variable is the number of deceased children per woman, and the exposure term is the number of children ever born (hence parity is implicitly taken into account). This model is appropriate for a count dependent variable characterized by a variance that differs from its mean, such as the number of deceased children per woman. The advantage of this model over Poisson is that it accounts for unobserved heterogeneity among observations.[39] The output includes an additional parameter alpha that indicates the degree of dispersion in the predictions. Results of incidence-rate ratios (expB) are presented. The expression (expB − 1)*100 is interpreted as the percentage change in the incidence or risk of child mortality for categories of an independent variable with respect to the reference group.

The regression models are run using Stata 9 statistical software.[40] The Brass-type estimates of child mortality and the multivariate analyses are shown as unweighted data.

Results

 Table 1 shows the large regional variations in religious adscription by ethnicity. In general, indigenous women are more likely to be non-Catholics than their non-indigenous counterparts in the same region. Historical Protestant religions, in which Presbyterianism is prevalent, are

concentrated in Altos and Selva; while Pentecostalism is more relevant in Selva, Evangelicalism in Altos and Seventh Day Adventism in Norte and "other" regions.

Some of these religions not only are successful among indigenous people, Adventists are much more numerous in Norte and in "other" regions independently of the ethnic component, and among non-indigenous women residing in Selva. In addition, Pentecostal-Evangelical religions in Selva have substantial representation among non-indigenous women. Note that the high affiliation of non-indigenous people with the Catholic Church stands up in Altos. This is explained by the presence of the colonial religious center in this zone and the success of the evangelization labor of the Diocese of San Cristobal among non-indigenous people. In contrast, here indigenous women present the highest no-affiliation rate in Chiapas.

Brass-type estimates of the probability of child mortality are shown in **Table 2**. Panel A confirms that, in general, children born to indigenous women have higher probabilities of dying at all ages compared to non-indigenous. However, panel B reveals that mortality rates among Historical Protestants and Pentecostals, favored by indigenous groups, are indeed lower than those of Catholics in most age groups. Next we study the variables that may account for these findings by analyzing separately child mortality among indigenous and non-indigenous populations.

Table 3 presents the distribution of variables that are included in the multivariate analysis for women aged 15-39 with CEB. As was the case in Table 1, parous indigenous women of reproductive age are less likely to be Catholic and more likely to be Protestant or Pentecostal, compared to their non-indigenous counterparts. Non-indigenous women in our sample are about 27 percent more likely to be Catholic. In contrast, indigenous women are almost three times more likely to be affiliated with Historical Protestants and two times more likely to be Pentecostal-Evangelical than non-indigenous women.

Indigenous women are somewhat younger and less educated, and more likely to participate in governmental programs of development, live in a house with dirt floors, and reside in rural areas than non-indigenous women. Also, indigenous women are less likely to use health services and to attend to the medical services of the social security systems or other providers than non-indigenous women. In contrast, they are more likely to use SSA or IMSS-Solidaridad services. In addition, they are located mostly in Norte, Selva and Altos, zones of high marginalization, and only half of them are bilingual, which not only signals their lack of integration into mainstream society, but also may affect their well-being by limiting their access to information.

Results from the multivariate analyses are presented in **Table 4** for indigenous women and **Table 5** for non-indigenous women. In each case, we use three model specifications. **Model 1** assesses the differences in child mortality by religious affiliation net of the effect of maternal age. **Model 2** adds socioeconomic covariates that are expected to contribute toward explaining the differentials in mortality associated with religion. **Model 3** includes use of health services and participation in *Procampo* or *Progresa* that are possibly endogenous and highly correlated with those previously introduced.

Model 1 in **Table 4** shows that the risk of child mortality for **indigenous women** is about 19 percent lower for Historical Protestants and 12 percent lower for Pentecostal-Evangelical compared to Catholics, after maternal age differences are taken into account. The chances of child mortality increase with maternal age, which may be associated with the decrease in child mortality in the region during the last decades.

The incidence-rate ratios of child mortality for Historical and Pentecostal with respect to Catholics remain significant after introducing socioeconomic variables in **Model 2**, though the mortality gap decreases slightly. As we expected, part of the explanation of the mortality differentials among these groups is their socioeconomic condition. The opposite is found for

women with no religious affiliation; their incidence-rate ratios of child mortality compared to Catholics become marginally significant after the introduction of covariates.

With respect to the socioeconomic factors, bilingual women present a risk of child mortality 13 percent lower than that of monolingual indigenous women. Education shows a gradient relationship with child mortality: studying 1-5 years diminishes the incidence of child mortality by 13 percent and studying 9 or more years, by 39 percent compared to no schooling. Having floors other than dirt reduces the risk of dying by 15 percent. Finally, residing in Selva is associated with decreased risks of child mortality and living in "other" region increases significantly these risks compared to Norte.

Use of medical services and Progresa in **Model 3** results in small changes in the coefficients for religious adscription and for the socioeconomic factors previously introduced. With respect to health services, using medical services provided by the social security system reduces the incidence of child mortality in 12 percent, while using SSA or IMSS-Solidaridad does it in 10 percent versus being a non-user. In addition, the risk of child mortality is seven percent lower if the women participated in *Progresa* or *Procampo*.

Table 5 depicts the incidence-rate ratio of child mortality among **non-indigenous women**. In **Model 1**, women without religious affiliation present nine percent higher risk of child mortality compared to Catholics, but there are no significant differences in child mortality associated with other religions. Similar to findings among indigenous women, maternal age is positively associated with child mortality. In contrast, with the introduction of socioeconomic factors in **Model 2**, the significance of the relationship between religious adscription and child mortality among non-indigenous women disappears. As before, additional schooling and living in a house with floors other than dirt, and residence in Selva versus Norte, are significantly associated with reductions in child mortality. Finally, with respect to non-users, the use of medical services offered by the social

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security system and private providers significantly reduces the risk of child mortality, but participation in government programs does not appear to have a significant impact.

Discussion

This study explored whether maternal affiliation with a non-Catholic religion is associated with lower child mortality. We provided a description of the main religious congregations in Chiapas, Mexico, by region and mother's tongue. Then, we estimated the probability of child mortality at different ages by language and by religious affiliation with the Brass' method and, finally, we assessed child mortality differentials by religion among indigenous and non-indigenous populations net of the effect of socioeconomic variables.

Although Protestantism could be associated with higher child mortality due to the fact that indigenous are both, more likely to be Protestants and to have higher child mortality, the multivariate analysis showed that for some Protestant congregations this is not the case.

Our central finding is that child mortality is significantly lower among indigenous women affiliated with Historical Protestant and Pentecostal-Evangelical religions compared to Catholics. These differentials remain significant even after including various socioeconomic controls. The strong association between affiliation with Historical Protestantism and lower child mortality among indigenous women is consistent with findings for northeast Brazil, where Historical Protestants also presented a substantial advantage in child survival compared to Catholics.[23] This association, however, does not apply to non-indigenous Protestant women.

Also our results confirmed the importance of public health care services in reducing child mortality. Regardless of ethnicity, users of health services provided by the social security systems presented lower child mortality rates than non-users of health services. This was also true among indigenous women who use SSA or IMSS-Solidaridad.

Several other socioeconomic factors had significant impact on child mortality such as maternal education, type of floors in the household and region of residence. The effect on child survival of bilingualism for indigenous populations and that of formal education were predictable since they increase knowledge about health and access to resources and information. However, the reasons other associations were statistically significant, such as greater child survival among Selva residents compared to those in Norte, are not obvious and would entail additional research.

Future studies should focus on the mechanisms that result in greater child survival among indigenous Protestants compared to Catholics. Understanding the specific pathways through which religion influences child survival would require additional variables not available in the Census data. Within the present analysis we can only speculate, as in other studies,[22,23] that if the mortality gap between Protestant and Catholic indigenous is not due to socioeconomic differentials, then it could come from differences in life-style, less gender inequality, extended social networks, access to alternative forms of health care or knowledge on preventive health care, and coping better with poverty.

The marginally significant association between no religious affiliation and lower child mortality among indigenous women suggest some variables may have been omitted from our analysis. Community-level variables such as health campaigns may bring about possible spillovers of benefits linked to certain religious congregations. Civil participation may also account for positive changes in life styles and health behaviors possibly related to child mortality among indigenous people such as alcohol comsuption.[15] On the other hand, an environment of religious or political intolerance may be detrimental to child survival as has been shown previously.[20] Moreover, these kinds of variables may also account for inter-regional differentials in child mortality.

A promissory line of research could focus also on how religious affiliation affects children's health via the response of different religious congregations to development programs, either

sponsored by the government or by non-governmental-organizations, or their active participation in shaping them.

There are some limitations in this study. First, the cross-sectional nature of our data limits our analysis. In particular, the causality between religious conversion and child survival is not clear since we are unable to ascertain whether the outcomes of child mortality correspond to before or after conversion. Similarly, there are selectivity issues that cannot be resolved here. Women could modify behaviors that result in better child health as a result of conversion, but it could also be that certain attitudes favorable to child survival are part of the selection process that results in affiliation to a particular religion.

Another limitation refers to the lack of information about access to schooling and medical services. It is unclear whether women who do not use medical health care services lack access to them or differ in their attitudes toward them.

Finally, in terms of religious practices, neither diversity within Catholicism nor degree of religiosity were captured by the Census questionnaire. Moreover, for analytical simplification, we coded under broad categories several smaller religious groups that may differ substantially in their styles of worship and doctrines. It may be that these aggregations canceled out the advantage in child survival of some groups with the possibly high child mortality of other groups.

Table 1. Distribution of Chiapanecan women 15 to 49 years old by religious affiliation, ethnicity and region of residence (%)

	REGION							
	Norte		**Altos**		**Selva**		**Other**	
Religious affiliation	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous
Catholic	**53.8**	**60.8**	**53.6**	**88.5**	**51.0**	**65.1**	**66.7**	**69.8**
Historical								
Baptist	1.5	0.8	0.8	0.2	0.4	0.3	0.2	0.7
Del Nazareno	0.0	0.0	0.0	0.1	0.0	0.1	0.1	1.1
Presbyterian	6.2	1.0	14.1	0.9	22.6	4.3	3.8	1.8
Other historical	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	**7.7**	**1.7**	**14.8**	**1.1**	**23.0**	**4.7**	**4.1**	**3.5**
Pentecostal and Evangelical								
Pentecostal								
Asambleas de Dios	1.0	0.0	0.1	0.0	1.0	0.3	0.0	0.0
Iglesia de Dios	0.0	0.0	0.8	0.1	0.2	0.3	0.5	0.1
Iglesia del Evangelio Completo	0.2	0.1	0.0	0.0	0.8	2.6	0.0	0.0
Sociedades Cristianas	0.3	0.1	0.6	0.5	0.0	0.0	0.0	0.2
Pentecostal	5.2	4.2	5.1	1.2	8.6	5.0	3.3	4.0
Other pentecostal	0.1	0.3	0.3	0.3	0.2	0.1	0.2	0.4
Pentecostal no specified	0.0	0.0	0.2	0.0	0.2	0.0	0.0	0.1
Evangelical								
Christian	0.1	0.3	0.2	0.7	0.2	0.6	0.3	0.6
Evangelical	0.4	1.6	2.9	1.6	1.2	1.5	1.2	1.7
Iglesia de Cristo	0.0	0.0	0.2	0.2	0.1	0.2	0.1	0.2
Other evangelical	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Evangelical no specified	0.1	0.2	0.5	0.2	0.3	0.1	0.2	0.3
Subtotal	**7.3**	**6.8**	**10.7**	**4.8**	**12.8**	**10.8**	**5.9**	**7.8**
Biblical non-evangelical								
Adventist of the 7th	22.7	15.9	4.6	0.5	2.6	3.9	14.0	4.1
Mormon	0.0	0.0	0.1	0.2	0.0	0.1	0.1	0.4
Jehova Witnesses	0.1	1.2	0.2	1.4	0.5	4.2	1.1	3.9
Subtotal	**22.8**	**17.1**	**4.9**	**2.1**	**3.1**	**8.3**	**15.2**	**8.4**
Other Non-Christian	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
No affiliation	**8.3**	**13.1**	**15.4**	**2.8**	**8.9**	**10.3**	**7.9**	**10.4**
Undetermined	**0.2**	**0.4**	**0.5**	**0.7**	**1.4**	**0.8**	**0.2**	**0.2**
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Unweighted N	8,868	10,007	15,684	2,662	10,300	3,941	4,911	58,873

Note: Weighted sample

Source: Estimations based on the 10% Mexican Census Sample, INEGI, 2000.

**Table 2. Brass-type estimates of child mortality by ethnicity and by religious affiliation,
Chiapanecan women 15 to 39 years old**

Ethnicity, religious affiliation and age	x	N	CEB	SCEB	D/B	q(x)
PANEL A: ETHNICITY (n=96737)						
Indigenous						
15-19	1	9,860	3,144	3,008	0.0433	0.0410
20-24	2	8,072	12,097	11,479	0.0511	0.0516
25-29	3	6,418	19,333	17,971	0.0704	0.0698
30-34	5	4,824	21,397	19,596	0.0842	0.0850
35-39	10	4,588	25,312	22,664	0.1046	0.1078
Non-indigenous						
15-19	1	17,482	4,123	3,943	0.0437	0.0418
20-24	2	14,725	16,314	15,521	0.0486	0.0489
25-29	3	11,890	25,741	24,400	0.0521	0.0513
30-34	5	9,827	30,720	28,913	0.0588	0.0590
35-39	10	9,051	36,667	33,801	0.0782	0.0801
PANEL B: RELIGIOUS AFFILIATION (n=96503)						
Catholic						
15-19	1	16,429	3,916	3,743	0.0442	0.0421
20-24	2	13,748	15,655	14,870	0.0501	0.0508
25-29	3	11,273	25,954	24,398	0.0600	0.0595
30-34	5	9,126	30,491	28,399	0.0686	0.0693
35-39	10	8,607	36,969	33,682	0.0889	0.0916
Historical Protestant						
15-19	1	1,963	531	498	0.0621	0.0597
20-24	2	1,612	2,151	2,066	0.0395	0.0403
25-29	3	1,297	3,599	3,415	0.0511	0.0510
30-34	5	992	3,941	3,688	0.0642	0.0651
35-39	10	946	4,958	4,511	0.0902	0.0933
Pentecostal-Evangelical						
15-19	1	2,376	689	666	0.0334	0.0324
20-24	2	1,978	2,775	2,642	0.0479	0.0484
25-29	3	1,514	4,174	3,927	0.0592	0.0583
30-34	5	1,224	4,876	4,527	0.0716	0.0718
35-39	10	1,166	5,981	5,464	0.0864	0.0885
Biblical Non-Evangelical						
15-19	1	3,024	910	865	0.0495	0.0452
20-24	2	2,400	3,157	2,993	0.0519	0.0519
25-29	3	1,796	4,623	4,338	0.0616	0.0608
30-34	5	1,465	5,601	5,216	0.0687	0.0692
35-39	10	1,287	6,134	5,604	0.0864	0.0889
No religious affiliation						
15-19	1	3,473	1,183	1,143	0.0338	0.0326
20-24	2	3,001	4,593	4,353	0.0523	0.0518
25-29	3	2,397	6,624	6,197	0.0645	0.0624
30-34	5	1,809	7,083	6,557	0.0743	0.0733
35-39	10	1,600	7,789	7,079	0.0912	0.0919

Note: Unweighted sample. Estimation of q(x) based on Trussell's coefficients for the West model.
Source: Estimations based on the 10% Mexican Census Sample, INEGI, 2000.

Table 3. Descriptive statistics for the analysis of child mortality and religion by ethnicity, Chiapanecan women 15 to 39 years old with CEB (%)

VARIABLE	Categories	Indigenous women	Non-indigenous women
Religious affiliation	Catholic	53.6	67.9
	Historical Protestant	15.1	3.4
	Pentecostal-Evangelical	11.0	8.2
	Biblical Non-Evangelical	9.0	8.5
	No religious affiliation	11.4	11.9
Age	15-19	9.8	7.3
	20-24	24.8	21.6
	25-29	24.9	24.8
	30-34	20.1	23.9
	35-39	20.5	22.5
Language	Indigenous monolingual	47.0	- - -
	Indigenous bilingual	53.0	- - -
Education	No instruction	45.0	15.1
	1-5 years	32.4	30.1
	6-8 years	16.6	24.3
	9 years and more	6.0	30.4
Floor	Dirt	72.8	29.7
	Other	27.2	70.4
Rural place of residence	- - -	72.3	42.4
Region of residence	Norte	13.7	7.2
	Altos	33.1	4.1
	Selva	36.7	4.4
	Other	16.5	84.4
Medical service commonly used	None	14.0	3.0
	IMSS, ISSSTE or Pemex	11.4	20.2
	SSA or IMSS Solidaridad	62.0	45.4
	Private or other	12.7	31.4
Participation in Progresa	- - -	38.4	19.3
Unweighted sample size		19127	36550

Note: Weighted sample
Source: Estimations based on the 10% Mexican Census Sample, INEGI, 2000.

Table 4. Incidence-rate ratios of child mortality by religious affiliation in Chiapas, indigenous women 15 to 39 years old with CEB (n=19127). Negative binomial regression

Independent variables	Categories	Model 1 IRR p>z		95%CI	Model 2 IRR p>z		95%CI	Model 3 IRR p>z		95%CI
Religious affiliation	Historical Protestant	0.81 ***	0.74	0.89	0.83 ***	0.75	0.92	0.83 ***	0.75	0.92
(Catholic)	Pentecostal-Evangelical	0.88 *	0.79	0.97	0.89 *	0.80	0.99	0.89 *	0.80	0.99
	Biblical Non-Evangelical	0.94	0.84	1.04	0.92	0.83	1.02	0.93	0.83	1.03
	No religious affiliation	0.98	0.90	1.07	0.92 +	0.84	1.01	0.92 +	0.84	1.01
Age	20-24	1.27 *	1.03	1.56	1.27 *	1.03	1.56	1.27 *	1.03	1.57
(15-19)	25-29	1.73 ***	1.42	2.11	1.68 ***	1.38	2.05	1.70 ***	1.39	2.07
	30-34	2.11 ***	1.73	2.58	1.99 ***	1.63	2.43	2.02 ***	1.65	2.46
	35-39	2.56 ***	2.11	3.12	2.36 ***	1.94	2.87	2.40 ***	1.97	2.92
Language (Monolingual)	Bilingual				0.86 ***	0.80	0.93	0.86 ***	0.80	0.92
Education	1-5 years				0.87 ***	0.80	0.93	0.87 ***	0.81	0.94
(No formal instruction)	6-8 years				0.72 ***	0.64	0.80	0.72 ***	0.65	0.80
	9 years and more				0.61 ***	0.49	0.76	0.61 ***	0.49	0.77
Floor (Dirt)	Other				0.85 ***	0.78	0.91	0.85 ***	0.79	0.92
Place of residence (Urban)	Rural				0.94	0.86	1.03	0.96	0.88	1.04
Region	Altos				1.02	0.94	1.11	1.01	0.93	1.10
(Norte)	Selva				0.80 ***	0.73	0.88	0.80 ***	0.73	0.88
	Other				1.16 ***	1.05	1.28	1.13 *	1.02	1.25
Medical service used	IMSS, ISSSTE or Pemex							0.88 *	0.77	1.00
(None)	SSA or IMSS Solidaridad							0.90 *	0.82	0.98
	Private or other							0.95	0.83	1.07
Progresa (No)	Yes							0.93 *	0.87	0.99
Alpha		0.86 ***	0.77	0.96	0.78 ***	0.69	0.87	0.77 ***	0.69	0.87
Log-likelihood		-11721.0			-11626.0			-11619.4		

***p<=.001 **p<=.01 *p<=.05 +p<=.1

Note: Unweighted sample. Reference category in parenthesis. Number of children ever born is taken as exposure.

Source: Estimations based on the 10% Mexican Census Sample, INEGI, 2000.

Table 5. Incidence-rate ratios of child mortality by religious affiliation in Chiapas, non-indigenous women 15 to 39 years old with CEB (n=36550). Negative binomial regression

Independent variables	Categories	Model 1			Model 2			Model 3		
		IRR p>z	95%CI		IRR p>z	95%CI		IRR p>z	95%CI	
Religious affiliation	Historical Protestant	1.04	0.90	1.19	1.00	0.87	1.15	0.99	0.86	1.14
(Catholic)	Pentecostal-Evangelical	1.06	0.96	1.17	1.01	0.91	1.11	1.00	0.91	1.10
	Biblical Non-Evangelical	1.07	0.97	1.16	0.97	0.88	1.06	0.96	0.87	1.05
	No religious affiliation	1.09 *	1.01	1.18	0.98	0.90	1.06	0.97	0.89	1.05
Age	20-24	1.14	0.95	1.36	1.18 +	0.99	1.41	1.19 +	1.00	1.42
(15-19)	25-29	1.25 **	1.06	1.49	1.32 ***	1.11	1.56	1.33 ***	1.12	1.58
	30-34	1.40 ***	1.18	1.65	1.44 ***	1.21	1.70	1.46 ***	1.23	1.73
	35-39	1.85 ***	1.57	2.18	1.79 ***	1.52	2.12	1.82 ***	1.54	2.15
Education	1-5 years				0.88 ***	0.82	0.94	0.89 ***	0.83	0.95
(No formal instruction)	6-8 years				0.66 ***	0.60	0.71	0.67 ***	0.62	0.73
	9 years and more				0.45 ***	0.40	0.50	0.49 ***	0.44	0.54
Floor (Dirt)	Other				0.82 ***	0.77	0.87	0.83 ***	0.78	0.88
Place of residence (Urban)	Rural				1.06 +	1.00	1.13	1.04	0.98	1.11
Region	Altos				0.97	0.81	1.15	0.95	0.80	1.14
(Norte)	Selva				0.66 ***	0.56	0.77	0.65 ***	0.56	0.77
	Other				0.98	0.91	1.06	0.98	0.91	1.06
Medical service used	IMSS, ISSSTE or Pemex							0.68 ***	0.58	0.79
(None)	SSA or IMSS Solidaridad							0.92	0.81	1.06
	Private or other							0.87 *	0.75	1.00
Progresa (No)	Yes							1.00	0.94	1.07
Alpha		1.08 ***	0.98	1.20	0.94 ***	0.84	1.05	0.93 ***	0.83	1.03
Log-likelihood		-15563.6			-15305.2			-15282.635		

***p<=.001 **p<=.01 *p<=.05 +p<=.1
Note: Unweighted sample. Reference category in parenthesis. Number of live children ever born is taken as exposure.
Source: Estimations based on the 10% Mexican Census Sample, INEGI, 2000.

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