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Preliminary Demographic Analysis of a Toba Population in Transition in Northern Argentina

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Abstract

The Toba represent one of the many indigenous groups inhabiting the Gran Chaco of South America. They currently live in communities with different degrees of acculturation. We present here a preliminary data on fecundity and mortality estimates for a rural Toba population located in the province of Formosa, Argentina. Reproductive histories (n = 435) were obtained from villagers 12 years old and older. Reproductive histories were cross-checked with other sources such as national identification documents, health records kept at the local health center, and previous censuses to verify the information obtained. The analysis presented here includes data from 1981 to 2002. We estimated the crude birth rate, total fertility rate, the crude death rate, and the rate of population growth. The results show high rates of population growth determined by pre-transitional values of birth and fertility rates and a decrease in mortality rates. This reduction in mortality may be attributed to a slow improvement of life conditions among the Toba, in particular, access to health care and food security. The first two periods analyzed indicated a mild immigration pattern, while in the rest of the years there was a strong emigration. This finding would reflect a situation of crisis and social tensions within and outside the Toba population. This study can contribute to our understanding of demographic dynamics in populations which are experiencing a rapid lifestyle transition; in this case, from a hunter-gatherer recent past to a market economy future.

Keywords

Toba, Gran Chaco, Formosa, Argentina, acculturation, reproductive histories, birth rate, fertility rate, crude death rate, rate of population growth

Disciplines

Demography, Population, and Ecology | Family, Life Course, and Society | Social and Behavioral Sciences | Sociology

Comments

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Abstract

The Toba represent one of the many indigenous groups inhabiting the Gran Chaco of South America. They currently live in communities with different degrees of acculturation. We present here a preliminary data on fecundity and mortality estimates for a rural Toba population located in the province of Formosa, Argentina. Reproductive histories (n = 435) were obtained from villagers 12 years old and older. Reproductive histories were cross-checked with other sources such as national identification documents, health records kept at the local health center, and previous censuses to verify the information obtained. The analysis presented here includes data from 1981 to 2002. We estimated the crude birth rate, total fertility rate, the crude death rate, and the rate of population growth. The results show high rates of population growth determined by pre-transitional values of birth and fertility rates and a decrease in mortality rates. This reduction in mortality may be attributed to a slow improvement of life conditions among the Toba, in particular, access to health care and food security. The first two periods analyzed indicated a mild immigration pattern, while in the rest of the years there was a strong emigration. This finding would reflect a situation of crisis and social tensions within and outside the Toba population. This study can contribute to our understanding of demographic dynamics in populations which are experiencing a rapid lifestyle transition; in this case, from a hunter-gatherer recent past to a market economy future.

Introduction

Demographic transitions consist of variations in the patterns of population mortality and fertility. The last transition, the most important as far as the number of people who have crossed it and are still crossing it, is characterized by a change from high birth rates and high death rates to low birth rates and low death rates (Popkin, 2002). According to the Demographic Transition Model (DTM), this transition involves four stages: from stage 1, characteristic of pre-industrial societies to stage 4, typical of developed, industrialized populations (Caldwell et al. 2006). Individual populations may pass through these stages at different paces and rhythms. In fact, many developing countries are exhibiting peculiar dynamics. To that respect, Argentina represents a very interesting case. In comparison to the rest of Latin America, Argentina is characterized by its precocity, starting to show at the beginning of a demographic transition during the last third of 19th century. As a consequence, Argentina's place in the transition spectrum is now one of the most advanced, along with Cuba, Uruguay, and Chile (Knoll, 2004). On the other hand, unlike the "classic" European model, Argentina has experienced an almost simultaneous reduction of mortality and fertility, not going through the typical demographic explosion of other Latin American countries (Pantelides, 1983). Another hallmark of this slow growth has been the great regional differences in the process of transition (Celton, 1995). Numerous studies have shown the extent of the variation in the transition process in the provinces and the sharp contrast with what happened in the capital city of Buenos Aires (Pantelides, 1983; Celton, 1995; Mazzeo, 1995; Meichtry, 1996; Alvarez and Maccagno, 2001; Mazzeo, 2001; Aryans Toledo and Colantonio, 2003; Brest and Prieto, 2004). For example, estimations made between years

1980-1990, show that the birth rate of the province of Jujuy was approximately twice the one for the city of Buenos Aires. As for mortality rates, the same province displayed figures five times higher than those for Buenos Aires (Mazzeo, 1995).

In this context, the northern province of Formosa is lagging far behind in the transition process. According to Brest and Prieto (2004) the total fertility rate for that province is 3.3, more than twice the one for the city of Buenos Aires (TFR =1.5). Mortality rates show comparable differences. The life expectancy of Formosa is currently 69.4 years, while the one for Buenos Aires is 72.7 years. If we consider that the Argentine indigenous populations have been historically marginalized, this situation is not surprising. According to data from the Complementary Survey of Indigenous Populations (Encuesta complementaria de Pueblos Indígenas, 2000), Formosa is one of the provinces with greater percentage of native populations. In this work, we are focusing on one of the four main indigenous nations: the Toba.

The Toba of the Gran Chaco have traditionally been semi-nomadic hunter-gatherers, with occasional horticulture (Mendoza and Wright 1989). Until the 1930's, these communities relied on this form of subsistence technology. During the last century, disruptions to their traditional lifestyle have forced important migrations to urban centers (Miller 1989; Miller 1999). However, many semi-isolated communities still use the forest and rivers as a source of food and shelter. This situation results in a spectrum of lifestyles and subsistence patterns that goes from the more traditionally living rural populations, to transitional peri-urban villages, to market-economy urban "*barrios*". Among the less acculturated groups we find the communities that live in the western region of the province of Formosa. Previous works by our research team indicated that these communities are in fact experiencing the beginning of a nutritional and epidemiological transition (Valeggia et al, 2004; Valeggia & Lanza 2004). We have also presented a preliminary analysis of demographic surveys conducted between years 1985 and a 2002 in these communities and results indicated a young population structure typical of pre-transitional populations (Lanza & Valeggia 2006). This analysis also revealed an important population growth, suggesting the possibility that these populations can be experiencing an incipient process of demographic transition. With the purpose of deepening our understanding about the population dynamics of populations in transition, we advance here some preliminary results of an analysis of mortality and fertility among the Western Toba.

Methods

The Western Toba inhabit a community-owned, 35,000-ha land located at 550 Km West of the city of Formosa. The number of Western Toba people is approximately 1600, distributed in 12 villages.

Reproductive histories were obtained by our research team from villagers 12 years old and older. Translators were used when the interviewee was not fluent in Spanish. The following information was recorded. For women: name, date of birth, age at menarche, reproductive status (pregnant, lactating, non-

pregnant/non lactating, menopausal), number of miscarriages or abortions, number of children born, offspring date of birth, death and cause of mortality, name of the father of each of her children. For men: name, date of birth, number of children born, offspring date of birth, death and cause of mortality, name of the mother of each of his children.

A total of 777 reproductive histories were obtained (435 from the Western Toba communities and 342 from Namqom). Reproductive histories were cross-checked with other sources such as national identification documents, health records kept at the local health center, and previous censuses to verify the information obtained. We also used information from records of births occurring between 1985 and 2002 provided by Toba health agents. In addition, we incorporated census data from the Civil Registrar between 1992 and 2002 and, for the communities of Vaca Perdida and La Rinconada, birth records between 1981 and 1984.

Results

Overall, there seems to be a downwards tendency in population growth in the Western communities. The mean total annual growth rate (r_T) between 1985 and 2002 was 44.53‰. Table 1 shows the values obtained for each period of analysis.

Table 1: Total annual growth rate (r_T) for each period (‰).

Period	r_T
1981 - 1985	67.41
1986 - 1991	32.39
1992 - 1999	18.65
2000 - 2002	21.46

Birth rates were found to be extremely high. Table 2 shows the crude birth rate for each of the periods analyzed.

Table 2: Crude birth rates for each period (‰).

Period	Annual births	Mean annual population	CBR
1981 - 1985	33	588	56.12
1986 - 1991	44	1035	42.51
1992 - 1999	67	1289	51.97
2000 - 2002	75	1460	51.36

Estimated values of total fertility rates were also substantially high (Table 3) without indication of upward or downward tendency for the periods considered. Table 4 shows the total mortality rates for the community of Vaca Perdida, for which we had the most complete dataset. There was a period of increased mortality between 1986 and 1991. Afterwards, mortality rates decreased, but never reached the ones of the period between 1981 and 1985.

Table 3: Total fertility rates (TFR) for the different periods (‰).

Period	Mean number of births	Mean number of females	TFR
1981 - 1985	33	128.2	257.4
1986 - 1991	44	199.0	221.1
1992 - 1999	67	268.6	249.5
2000 - 2002	75	308.3	243.2

Table 4: Annual crude death rate (CDR) for the community of Vaca Perdida (‰)

Period	Mean number of deaths	Mean annual population	CDR
1981 - 1985	1.4	216	6.48
1986 - 1991	2.5	232.5	10.75
1992 - 1999	2.4	249.8	9.50
2000 - 2002	2.3	264.3	8.82

After a period of instability, the mean natural growth rate seems to have reached a plateau since the early 1990's (Table 5).

Table 5: Mean natural growth rate (r_n) (‰).

Period	r_N
1981 - 1985	49.64
1986 - 1991	31.76
1992 - 1999	42.47
2000 - 2002	42.54

An evaluation of migration rates clearly indicates two phases for this population: an immigration phase in 1981 – 1991 and an emigration phase starting in 1992 (Table 6).

Table 6: Net migration rate for each of the periods analyzed (‰).

Period	Migration rate
1981 - 1985	17.77
1986 - 1991	0.63
1992 - 1999	-23.82
2000 - 2002	-21.07

Discussion

Analyses of the process of demographic transition in Latin America suggest a pre-transitional phase without great variations in the population size, followed by a demographic explosion phase. Indeed, this seems to be the case for the Toba populations we are studying. These preliminary analyses indicated growth values far superior than the ones reported by the Latin American Center for Demography (CEPAL/CELADE, 2000) for Argentina as a whole, between 1985 and 2002. However, similar tendencies were found in studies conducted in Brazil by Holy et al. (2002). According to these authors, the annual growth of a Xavante population between 1969 and 1990 was of 59.5%. In the same country, the native Kaiabi populations, between 1970 and 1999, had a rate of annual growth of 44,7% (Pagliaro. 2002). And for the Hupd'äh of Brazil, between the years the 2000 and 2003, the growth rate was of 65% per year (Machado et al., 2006). It is worth indicating that, for the Toba of Western Formosa, growth values do show a decreasing tendency.

Crude birth rates were also typical of pre-transitional populations. According to estimations made by the National Ministry of Health (1996), the crude birth rate for the province of Formosa as a whole between years 1970 and 1980 equaled 35.4%. Studies conducted by Machado et al. (2006) indicate a crude birth rate of 33.4% for the Hupd'äh populations of Brazil (2000-2003). Similar values have been shown for Bororo populations between years 1993 and 1996 (Souza et al. 2005). However, these birth rates are still considerably lower than the ones we found for the Toba. Given the high fertility values of Amerindian populations in general, we can not rule out the possibility of a global increase in fertility for the region. The causes of this increase remain to be elucidated.

The mortality rates we obtained also seem to be characteristic of pre-transitional populations. Estimations made by the INDEC/CELADE suggested a crude mortality rate of 9% for Formosa between years 1970 and 1975. These values are within the range found for other Amerindian populations: between 9,3% and 14,6% for the Kaiabi of Brazil Pagliaro (2002), 10% for native

populations in Colombia (Piñeros-Pertersen and Ruiz-Salguero, 1998), between 5,1% and 9,6% for the Bororo of Brazil (Souza et al. 2005), and 9.2% for the Brazilian Hupdáh (Machado et al. 2006). However, the dynamics of the Toba population under study show some peculiarities worth considering. The first time interval we analyze shows very low mortality values. We hypothesize that this situation might be the result of the development of a well-organized public health infrastructure in this region that began in the 1960's (Bargallo, 1992). According to this author, this system was carried out by several parties: 1) doctors and nurses of a local hospital located 50 km from these rural communities; 2) English Anglican doctors and nurses, who from beginnings of 1930's, had started a process of missionization of these native communities (Mendoza, 2002) and, 3) Toba health agents and midwives. However, the public health system began to fall apart at the beginning of the 1980's as a consequence of several sociopolitical factors. First was the forced abandonment of Argentina by the Anglican missionaries as a result of the armed conflict with the England for the Falklands Islands. However, the main event that catalyzed the rupture of the system was the political displacement of the director of the local hospital, who was the originator of the public health reform, at the end of 1980. This event caused great social and political tension in all the indigenous communities of the region. The crisis was so deep and pervading that most Toba people ceased to go to the hospital altogether. A likely consequence of this was the death of 30 Toba children in only two months (Bargallo, 1992). Thus, it is quite possible that the increase of the mortality values for that period reflects the serious situation that took place in those years, which was compounded by a national hyperinflationary crisis.

The values of mortality from of period 1992 - 1999 reflect a gradual decrease, perhaps indicating a slow improvement on the life condition for these communities. Unpublished results indicate a reduction of infant mortality during the same period, which would support this tendency. In addition, the decrease in mortality would explain the natural growth values we obtained. However, in agreement with Bargallo (1992), it is worth noting that at the beginning of 21st century mortality values had not yet reached the levels found in the 1980.

Migration estimates were, in general, substantially high compared to the migratory rates for the province of Formosa between years 1970 - 1980 and 1980 - 1990 (Ministry of Health and Social Action, 1996). Regardless of the small population size analyzed here, it is possible that the results we obtained reflect a great tendency for mobility which would be the result of their recent nomadic hunter-gatherer past (Miller and Braunstein, 1999; Mendoza, 2002). On the other hand, our results clearly show to an immigratory phase followed by an emigratory wave. The emigration from the rural areas to the urban centers is an almost universal process. In the case of this population, this migratory flow would involve the town of Ingeniero Juarez, located at 50 km from the Toba setting. It is possible that Ingeniero Juarez represents a promise of quality of life improvement for the Toba.

From estimations made by Mendoza (2002), at the beginning of 20th century, this Toba population consisted of 18 bands with an average number of

30 people each. Each of these bands occupied an area of, on average, 436 km². Without disregarding some overlap among these areas, these population density values are indicative of the low densities that were characteristic of these groups in the very recent past. This native population still retains their characteristics hunter-gatherer lifestyle (Gordillo, 2002; Mendoza, 2002; Valeggia et al., 2004); therefore it is possible that different aspects of their social dynamics are still those of populations living at low densities. As a consequence, the observed high growth values may be generating situations of internal social tension, which, in turn, may lead to an emigration process.

Conclusion

The results obtained in this study indicate a noticeable reduction of mortality. However, in comparison with the rest of the country, this population still lives in a very disadvantaged situation. Studies by our research group (Valeggia & Lanza 2004), indicate that this Toba population is still at the first stages of an epidemiological transition and rates of infectious diseases are still rampant. On the other hand, our analysis does point to any reduction in fertility measures. Furthermore, some authors suggest the development of pro-natalist reproductive strategies as part of the ethno-political dynamics of these populations (Mc Sweeney, 2004a and 2004b). As a consequence, we cannot rule out a possible increase in fertility for the period analyzed.

Finally, as a result of the reduction in mortality and the persistence of a high fertility behavior, this rural population is experiencing an accelerated process of population growth. This situation has also been reported in numerous native populations in the Americas (Hern, 1991; Piñeros-Petersen and Ruiz-Salguero, 1998; Azevedo, 2000; Souza and Santos, 2001; Mc Sweeney, 2002; Pagliaro, 2002; Holy ET al., 2002; Mc Sweeney, 2004a and 2004b; Machado ET al., 2006; Souza ET al., 2005). For this Toba population, the increase in population growth is far superior than the one experienced by non-indigenous populations in the rest of the Gran Chaco region. This disproportion, in turn, implies a gain in the demographic weight of the Toba population relative to the others. It would be interesting and important to study what impact this increase in demographic weight will have on the social visibility and representation of these populations in the current times of political turmoil.

References

- Alcaraz Lopez, G. M. *A fecundidade entre os Guarani: Um legado de kunhankarai*. Tesis Doctoral. <http://bases.bireme.br/cgi-bin>. 2000.
- Azevedo, M. "How Many Were They? How Many Will They Be?". Instituto Socioambiental. <http://socioambiental.org/website/pib/english/whwhhow/howmany/eramseraoi.html>. 2000.
- Alvarez, S., Maccagno, A. "Diferenciales de la Mortalidad en Argentina, a fines del siglo XX". Actas de la VI Jornadas Argentinas de Estudios de Población. CD-ROM. 2001.

- Arias Toledo, B., Colantonio, S. "Diferenciales de fecundidad en Córdoba: estructura, nivel y grado de transición". *Revista Argentina de Antropología Biológica*. 2003. 5. 2: 45 - 62
- Ebanks, G. E. *Determinantes socioeconómicos de la migración interna, con especial referencia a la región de América Latina y el Caribe*. Comisión Económica para América Latina y el Caribe (CEPAL). Centro Latinoamericano de Demografía (CELADE). Agencia Canadiense para el Desarrollo Internacional (ACDI). 1993.
- Bargallo, L. *Shamanes, iglesias y atención primaria entre los Tobas del oeste de Formosa. Etnicidad y hegemonización en el campo de la salud*. Tesis de grado. 1992.
- Braunstein, J. & Miller, E. *Ethnohistorical Introduction. Peoples of the Gran Chaco*. E. Miller. Westport, CT, Bergin & Garvey. 1999.
- Brest, I., Prieto, N. "Denominación: condiciones demográficas de Argentina entre los años 1991 y 2001". *Actas del XIV Encuentro de Geohistoria Regional, IIGHI-CONICET*. 2004. 91 – 103.
- Caldwell, J. C.; Caldwell, B. K., Caldwell, P., McDonald, P. F., and Schindlmayr, T. *Demographic Transition Theory*. Dordrecht, The Netherlands: Springer. 2006.
- CEPAL/CELADE. 2000. Boletín demográfico No. 66 de julio.
- de la Cruz, L., Mendoza, M. "Tobas del oeste de Formosa: una praxis de des-dependización. El proceso de reconocimiento legal de la propiedad comunitaria de sus tierras". *Pastoral de la tierra. Cuaderno Nro. 1*. Centro de Estudios Cristianos. 1989.
- Gordillo, G. "La presión de los mas pobres: la reciprocidad, diferenciación social & conflicto entre los Toba del oeste de Formosa". *Cuadernos del Instituto Nacional de Antropología & Pensamiento Latinoamericano*. 1995. 15. 53-82.
- Gordillo, G. *The Bush, the Plantations, and the "Devils": Culture and Historical Experience in the Argentinean Chaco*. Ph.D. Dissertation. Graduate Department of Anthropology, University of Toronto. 1999.
- Gordillo, G. "Locations of Hegemony: The Making of Places in the Toba's Struggle for *La Comuna*", 1989-99. *American Anthropologist*. 2002. 104(1): 262-277.
- Hern, W. "Health and demography of native Amazonians: historical perspective and current status". *Cadernos de Saúde Pública*. 1991. 7. 4. 451 – 480.
- INDEC/CELADE. 1996. Serie Análisis Demográfico N° 7.
- INDEC – CELADE. Estimaciones y Proyecciones de Población. Total del país Versión revisada. 1950 - 2050. Serie Análisis Demográfico 5. 1995.
- Lanza, N., Vallengia, C. "Caracterización demográfica de una población Toba de Formosa". *Actas del XXVI Encuentro de Geohistoria Regional (en prensa)*. 2006.
- Machado, M., Pagliaro, H., Baruzzi, R. G. "Análise do Perfil Demográfico dos Índios Hupd'ãh da Região do Alto Rio Negro, Amazonas, no período de 2000 a 2003". XV Encontro Nacional de Estudos Populacionais, ABEP, realizado em Caxambu-MG-Brasil, de 18 a 22 de setembro. 2006.
- Mc Sweeney, K. "Indigenous population growth in the lowland neotropics: social science insights for biodiversity conservation". *Conservation Biology*. 2004a. 19. 5. 1375 – 1384.
- Mc Sweeney. K. "A 'Demographic Turnaround'. The Rapid growth of indigenous populations in lowland Latin America". *Latin American Research Review*. 2004b. 40. 1. 3 – 30.

- Mazzeo, V. "Dinámica Demográfica de Argentina en el Período 1947 – 1991. Análisis de sus Componentes y Diferenciales". II Jornadas Argentinas de Estudios de la Población. H. Senado de la Nación. Secretaría Parlamentaria. Dirección Publicaciones. 1995. pp. 19 – 35.
- Mazzeo, V. "La mortalidad infantil en la Argentina. ¿Se cumplirán las metas del año 2000?" Actas de la VI Jornadas Argentinas de Estudios de Población. CD-ROM. 2001.
- Meichtry, N. "Tendencias Demográficas Recientes en Argentina y en las Provincias del Nordeste". *X Encuentro de Geohistoria Regional*, IIGHI-CONICET. 1996. 347 – 367.
- Mendoza, M. *Band mobility and leadership among the western Toba hunter-gatherers of Grand Chaco in Argentina*. The Edwin Mellen Press. 2002.
- Ministerio de Salud y Acción Social. Proyecciones de población por sexo y grupos de edad: urbana - rural y económicamente activa (1990 - 2025) y por provincia (1990 - 2010) (Versión revisada). Serie Análisis Demográfico 7. Programa Nacional de Estadísticas de Salud. INDEC, Situación y Evolución Social N°3 e INDEC - CELADE. 1996.
- Otero, H. *La transición demográfica argentina a debate: Una perspectiva espacial de las explicaciones ideacionales, económicas y político-institucionales*. 2004.
- Pagliari, H. "A recuperação demografica dos povos indígenas do Brasil: a experiência dos Kaiabi do Parque Indígena do Xingu – Mato Grosso". Actas del XIII Encontro da Associação Brasileira de Estudos Populacionais. 2002.
- Pantelides, E., A. "La transición demográfica argentina: un modelo no ortodoxo". *Desarrollo Económico*. XII. 1983. 88. 1 – 25.
- Piñeros-Petersen, M., Ruiz-Salguero, M. "Aspectos demográficos en comunidades indígenas de tres regiones de Colombia". *Salud Publica de México*. 1998. 40. 4: 324 – 329.
- Popkin BM. 2002. An overview on the nutrition transition and its health implications: the Bellagio meeting. *Public Health Nutrition*. 5(1A): 93-103.
- Santos, R. V., Flowers, N. M., Coimbra, C. E. A. "Epidemias, Demografia e Organização Social: um estudo de caso sobre os efeitos da expansão da froteira sobre os Xavante do Brasil Central". Actas del XIII Encontro da Associação Brasileira de Estudos Populacionais. 2002.
- Souza, L., Santos, R. "Perfil demográfico da população indígena Xavante de Sangradouro-Volta Grande, Mato Grosso (1993-1997)", Brasil. *Cadernos Saúde Pública*, Rio de Janeiro, 2001. 17. 2: 355-365.
- Souza, L., Pagliaro H., Santos, R. "Perfil demográfico dos índios Bororo de Mato Grosso, 1993-1996". IX Jornada Científica de Pós-Graduação e XIII Reunião Anual de Iniciação Científica, 2005, Rio de Janeiro. IX Jornada Científica de Pós-Graduação e XIII Reunião Anual de Iniciação Científica Ciência e Humanidade. Rio de Janeiro : FIOCRUZ. 2005. 421
- Valeggia, C. R., Lanza, N. "Tiempos de cambio: consecuencias de la transición nutricional en comunidades Toba de Formosa". Actas del XXIV Encuentro de Geohistoria Regional. IIGHI – CONICET. 2004a. 615 – 623.
- Valeggia, C. R., Lanza, N. A., Córdoba, L. I. "Fuentes de variación en la alimentación actual de los Toba-Pilagá del oeste formoseño". *Anales de la Sociedad Argentina de Americanistas*, Buenos Aires. 2004b. Tomo 2: 123 – 142.