Fertility Trends and Cultural Patterns of the Kamaiurá Women, Upper Xingu, Central Brazil*

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INTRODUCTION

After a long period of population decline, from the arrival of the Europeans colonists until half of the 20th century, Indigenous peoples in Brazil started to grow again (Gomes 1991; Melatti 1999). Around 5 millions in the 16th century, the Indigenous population in-Brazil was reduced to 120 thousand inhabitants in 1957 (Hemming 1978; Gomes 1991). Today they are 440 thousand, from 218 nations, speaking around 180 languages (Funai 2005; Funasa 2005; ISA 2005). Some of the peoples present mean growth rate of 3.5% per year, almost twice the growth of all Brazilians between 1991-2000, which was 1.64% per year (IBGE 2004). But the 50 Indigenous peoples that still live in isolation are running the risk of disappearing due to violence and diseases.

The Brazilian Institute of Geography and Statistics (IBGE) reported 294 thousand peoples that declared Indigenous status in the 1991 census and 734 thousand ones in 2000, which represents a 150% increase (IBGE 2004). The overestimating of Indigenous population in data census may result from an increased propensity of individuals to declare Indigenous status.

Anthropological demography studies carried out between the 1940s and the 1970s to evaluate the effects of population decline in Indigenous societies in Brazil, caused by the contact with the economic expansion fronts, showed that the peoples that were unaware of voluntary birth restrictions were able to attain a population stability and guarantee their survival in spite of high mortality rates, while the ones that were aware of birth control practices annihilated their growth potential (Wagley 1942, 1951). Ribeiro (1956,) who studied 13 peoples after their contact with the involving society noticed that structural factors inherent to the social organization of these peoples were associated to their demographic behavior. The author concluded that some of the peoples are able to recompose their population after this contact, while others, who are aware of contraceptive practices, like abortion and infanticide, in social disorganized situations, were not able to revert the population decrease.

The relations between cultural systems and demography regimes are being used as tools to explain behavior changes, mainly in fertility, in different societies, showing that anthropological knowledge may help to understand population processes (Das Gupta 1997). Different family and parenthood systems and their complex marriage and residence rules, age at first-marriage and at first birth patterns, conception and contraceptive rules, inter-birth intervals, lactation, etc., are cultural aspects that greatly influence the demography regimes of different societies. Davis &

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Blake (1967) study was the initial step towards a systematic consideration of the relation between fertility and socio-cultural variables, and was followed by several others that intended to relate the reproductive pattern to social and economic aspects.

In order to try to explain the recent reversion in the population decline of Indigenous peoples in Brazil, demographers and anthropologists resumed the discussions about the relation among cultural models, the interaction with the involving society and demography regimes, which were started by Wagley (1942; 1951), Ribeiro (1956) and other authors from the 1940s and 1950s. In these sense, analysis of cases with demographic and anthropological focus were carried out in the last decades aiming at explain the transition from a depopulation process to a recovering population size of several Indigenous nations in Brazil. Some of these studies put emphasis on period and cohorts analysis associating fertility behavior trends to cultural variables (Werner 1983; Early & Peters 1990; Flowers 1994; Green & Croker 1994; Picchi 1994; Meirelles 1988, Pagliaro 2002; Coimbra et al. 2002; Azevedo 2004; Camargo & Junqueira 2005).

The studies mentioned above confirmed that the growth of the Indigenous peoples in Brazil would be related to mortality rates decline and high fertility rates. Nevertheless, some questions appointed in these studies need yet to be clarified like, for example, whether present high fertility levels would be related just to the decline of infant mortality rates or to the way some of these peoples lead their biological reproduction without any external cultural interference. This could be the result of a stable growth option, in order to adequate the population size to the available technology and habitat, as suggested by Laraia (1996). This would be one of the questions, among so many others, that exist about Indigenous people recovery process in Brazil, that this study intends to clarify.

The Kamaiurá

The Kamaiurá are a Tupi-speaking nation that, with nine other peoples of the Aruak, Karib and Tupi languages groups, as well as the isolated Trumai language, live in a geographical area of the Upper Xingu, in the state of Mato Grosso, Central Brazil region. The cultural homogeneity among these peoples can be realized in several aspects, such as their large oval houses, their circular villages, body ornaments and paintings, feasts and ceremonies, alimentary habits, the use of uluri[1] by women, puberty seclusion and infanticide. This common cultural pattern was a result of the long occupation of the same geographic area as well as of interethnic marriages. (Orberg 1953, Galvão 1979, Junqueira 1978)

The first contact between the Kamaiurá and the non-indigenous society took place in 1887, when Karl von den Steinen second expedition (1940, 1942) met them near the Ipavu lagoon, in the Upper Xingu. Since then several expeditions made constant short visits to that region. In 1942,

1 Uluri – piece of clothing like a small triangle placed over the pubis.

with the institution of the Central Brazil Foundation (FBC), encampments started to be built in this area (Villas Boas 1994). In 1946, the Kamaiurá started to have regular contact with the members of the FBC Roncador-Xingu expedition. In 1961, the territory where they live became a reservation, which is at present called Xingu Indigenous Park (PIX), subordinated to the National Indian Foundation (FUNAI), a unit of the Justice Minister.

Population Trends

In 1948, when the ethnologist Kalervo Öberg (1953) visited the Kamaiurá people, they had abandoned their village, near the Ipavu lagoon, due to a flue epidemy, and they were living near the Tuatuari river, feeder of the right margin of the Culuene river, in a village with 6 houses and 110 inhabitants. Among them there were five Suyá, three Waurá and one Mehinako women, four Waurá and two Juruna men. In this same year, Galvão (1979) registered a population of 55 men and 55 women in the Tuatuari village. In 1954, there was an outbreak of measles that affected all the villages of the Upper Xingu, causing the deaths of 114 people of the 600 affected (Leão da Motta 1954). These numbers included 112 Kamaiurá of which 15 died (Seroa da Motta 1954). In 1966, when the doctors of the Federal University of São Paulo (UNIFESP) conduced the first medical examination the Kamaiurá were living again near the Ipavu lagoon. The village had 5 houses and a stable population of 110 inhabitants. In 1965, Junqueira visited the Kamaiurá for the first time and counted 128 inhabitants. During another visit, in 1971, there were 131 inhabitants living in 7 houses (Junqueira 1978). In 1985, due to a scission of the group, a new village was built up North (Morená), in the junction of the rivers Culuene, Batovi and Ronuro, feeders of the Xingu River. In 2002, the Ipavu village had 333 inhabitants and 18 houses, the Morená village 45 inhabitants and 5 houses, totaling 378 inhabitants (Pagliaro et al 2004).

These recent findings on Kamaiurá´s population history shows that, before 1966, mortality rate was high, due to wars among the nations and contagious diseases introduced through the contact with non-indigenous people, and fertility was low, as a result of a cultural pattern of small families, with 2 or 3 children, attained through birth control cultural practices such as contraception, abortion and infanticide (Junqueira 1978). This demographic pattern was responsible for the stability trend of the population between 1948-1966, of approximately 110 inhabitants. The 3.5% average population growth noticed between 1966-2002 would be the result of a change in this pattern, with the decrease of mortality levels and increase of fertility (Pagliaro et al 2004).

The changes in the demographic regime of this population suggest that since 1970, the Kamaiurá entered a period of demographic recovery. Supposing that this process has also been influenced by changes in their reproductive and cultural behavior, as well as by better health conditions, this study intends to identify the changes in the fertility pattern of the Kamaiurá during the three decades that followed the first study that was done by Camargo and Junqueira, in 1971,

and taking into consideration aspects of their social organization which affect their reproductive behavior.

MATERIAL AND METHODS

The Kamaiurá women fertility levels were observed in several moments between 1970 and 2003 (periods analysis), thus allowing a broad overview of the tendencies. The indicators represent the average of three ten year periods, 1970-79, 1980-89 and 1990-99, and a 4 year period, 2000-2003. Data has been gathered for long periods in order to avoid non-significant fluctuations.

Beside the period analysis, a longitudinal retrospective analysis has also been made through the observation of 61 women that were in their reproductive age until 2003. It was possible to follow up a complete fertility cohort and four cohorts of women still in their reproductive age, based on retrospective information on the date of birth of these women and their children. The estimated indicators were the distribution of births according to the age of the mothers and their average parity up to the ages when the cohorts were followed.

Besides the classical fertility mesures, we also analysed the mean age at child birth, first birth and last birth for those past their reproductive period and the interbirth intervals. Infanticide numbers have been added to the pregnancy ones, but have not been included in the fertility rate.

Gathered data showed that Kamaiurá´s women give birth to their first child after they are 15 years old and to their last one before 45 years ; but there are also women who gave birth earlier. Thus, for the period analysis, reproductive period includes women from 12 to 44 years of age.

In order to explain the fertility behaviour along this period, some of the sociocultural variables, that have influenced women´s reproductive patterns, were described. Variables like sexual intercourse frequency, unios and disruptions, permanent celibacy, volontary abstinence, conception and contraception were qualified and described**.**

Data has been gathered from: 1) medical records from São Paulo Federal University (UNIFESP) health program at Xingu Indigenous Park (PIX) from 1966 to 2003, which include information about births and deaths of all peoples, including the Kamaiurá; 2) Junqueira´s diaries, who has been in contact with the Kamaiurá since 1965; 3) survey at the Kamaiurá´s village in July and September 2003.

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LEVELS AND FERTILITY PATTERNS

Period Analysis

The crude birth rates (CBRs) of the Kamaiurá increased from 37.3 % to 46.4% between the 1970s and the 1980s and declined in the following decade reaching 41.9% in 2000-2003. The

general fertility rates (GFRs) follow the same pattern as the CBR, reaching in 2000-2003 period a similar level to the 1970s with 165.3 births per thousand women in reproductive age. During this period, the percentage of women in reproductive age varied between 22.8% and 25.4%. Total fertility rates (TFRs) also reached their highest level in the 1980s (6,6) followed by a slight decline tendency, reaching 6,2 in 2000-2003 (Table 1).

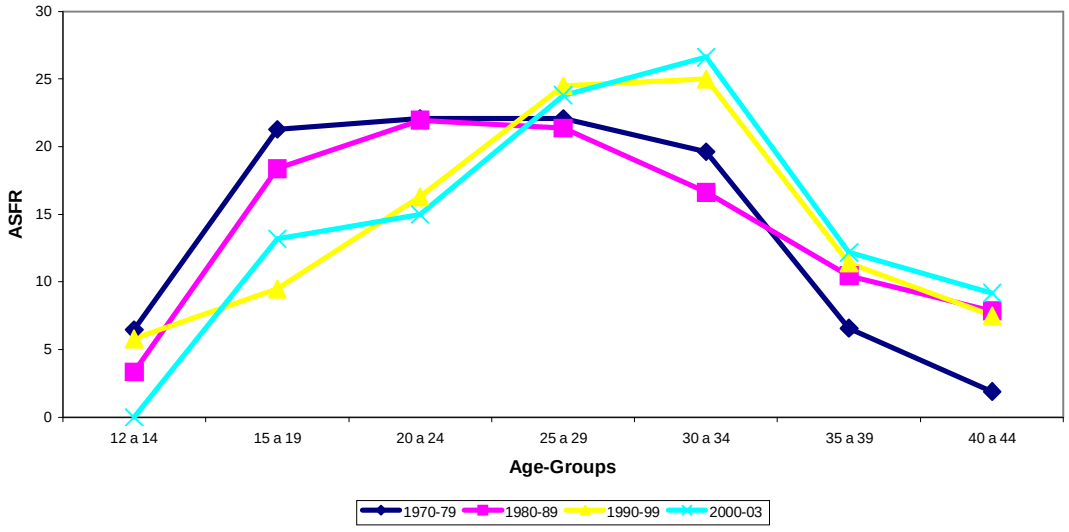
Table 1 - Kamaiurá´s Fertility Indicators, by periods, between 1970-2003

Indicators	1970-79	1980-89	1990-99	2000-03
Crude Birth Rates - CBRs	37,3	46,4	41,0	41,9
General Fertility Rates - GFRs	162,4	203,5	177,1	165,3
Total Fertility Rates - TFRs	5,4	6,6	6,4	6,2
% women in reproductive age	23,1	22,8	23,2	25,4
Mean age at child birth	24,4	24,4	26,4	26,4
Mean age at first birth	16,2	17,1	18,0	18,8

Source of crude data: UNIFESP

Age-specific fertility rates (ASFRs), presented in Figure 1, show that the 1980s fertility rate increase happened in all groups between 15-44 years age, without any reproductive pattern change. Since the 1990s there has been an ageing of age patterns, with the decrease of fertility levels among women in the 12-24 age groups, stability in the 25-29, and increase in the 30-34, which was the modal group in the 1990s and in 2000-2003.

Fig. 1 - Kamaiurá´s Age-Specific Fertility Rates, 1970-2003



The ageing of age patterns of the Kamaiurá´s women fertility has been confirmed by women mean age at child birth which increased from 24.4, in the 1970s and 1980s, to 26.4, in the 1990s and

in 2000-2003 period; and the increase of mean age at first birth from 16.2 years in the 1970s to 18.8 in 2000-2003 (Table 1).

Cohort analysis

The data of the reproductive history of 61 women, that were born between 1959 and 1983, made it possible to follow the parity of 5 cohorts until 2003, but just the first one with completed fecundity (Table 2)

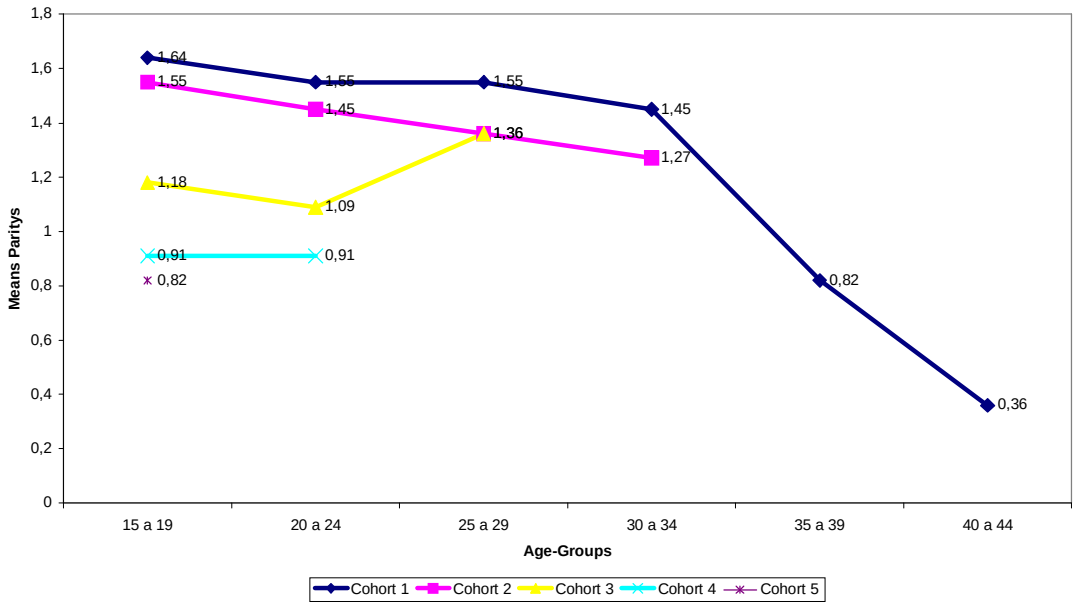
Table 2 - Kamaiurá´s women reproductive history by cohorts

Cohort's Characteristics	**Cohort 1**	**Cohort 2**	**Cohort 3**	**Cohort 4**	**Cohort 5**
Women birth years	1959-63	1964-68	1969-73	1974-78	1979-83
Number of women	11	11	11	11	17
Number of women with children	11	10	10	8	13
Means parity	7,37	6,18	4,08	2,64	1,47
Age of women in 2003	40-44	35-39	30-34	25-29	20-24
Mean age at first birth	17,0	17,6	17,9	17,4	18,1
Inter-birth intervals	35,4	33,5	31,8	36,70	30,30

Source of crude data: UNIFESP

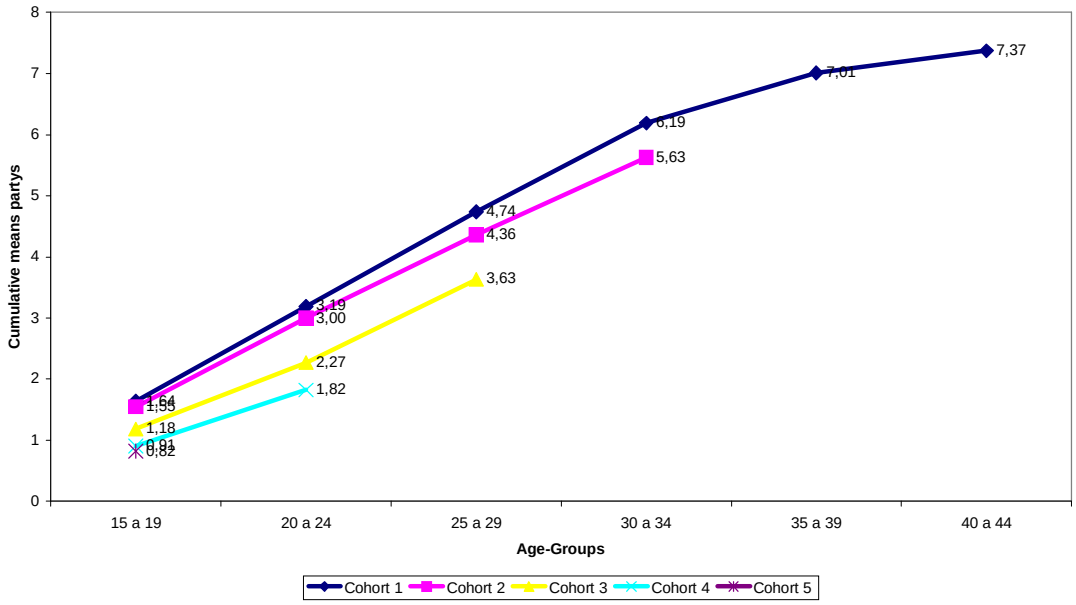
The means parity of theses cohorts shows a progressive reduction in the number of births of Kamaiurá women. Cohort 1, with completed fertility, presented an achieved fertility of 7.4 births. Mean parity of the 15-19 years, age group, which is reached by women in all cohorts, gradually decreases from 1.64 in cohort 1 to 0.91 in cohort 5. This also happens in mean parity of all other age groups (Figure 2).

Fig. 2 - Cohorts Means Paritys of Kamaiurá´s Women



The fertility decline of Kamaiurá women can be seen more clearly through the analysis of cumulative mean parity (Figure 3). As an example, cumulative mean parity of 20-24 age group, which includes women of cohorts 1 to 4, shows a decline from 1.55 to 0.91, from older to younger cohort (Table 2)

Fig.3 - Cumulative Means Paritys of Kamaiurá´s Women, by Cohorts



The mean age at first birth of the 5 cohorts varies from 17 to 18.1 years of age and the mean inter-birth intervals vary between 30.3 and 36.7 months (Table 2).

CULTURAL AND REPRODUCTIVE PATTERNS

Unions and disruptions

Marital relationships in Indigenous societies generally start at a very young age, what contributes to high fecundity. Soon after the first menses, Kamaiurá women are sent to seclusion for a period that does not last more than one year. When they come out of seclusion they receive a new name, they are considered adults, and are ready to get married. (Junqueira, 1978, 2002)

Marriage is determined by kinship system known in the anthropological literature by bifurcate merging where the preferred mate is the cross cousin (Öberg 1956; Junqueira 1978; 2002). According to rules, during the first years of marriage the husband should live in his wife´s parent house (matrilineal system). After this period, the couple can freely choose a new home, which is often the husband´s family house (patrilineal system). Nevertheless, this rule does not apply to those men who own a house or who are already married and having a polygynous family. In these situations women always move to their husbands homes (Junqueira 1978).

Marriages are considered accomplished just when the first child is born. The mean age at first birth has been considered in this analysis as a reference of the start of accomplished marriages. From 1970 to 2003, these means have increased from 16,2 to 18,8 years old (Table 1).

Permanent celibacy

As per Kamaiurá´s culture everybody is supposed to get married. Marriage, besides its procreative and sexual function, is also a must due to economic reasons, as work is divided according to gender (Junqueira 1978). In 2003, there were 73 women in reproductive period, in the Kamaiurá´s villages, and, of this total, 26% were still single: 70.6% belonged to the 15-19 age group, 31.3% to the 20-24 and 20% to the 25-29 group. There were also two women that never got married due to health problems, and they would stay forever in permanent celibacy. In a previous study performed by Camargo & Junqueira (2005) in 1971, there were just two single women (6.3%) of a total of 32 women above 15 years of age. In 2003, our field study at a Kamaiurá´s village has shown that young men were delaying the cultivation of their own fields, what suggested that they were postponing marriages.

Unions intervals

Couples separation can be followed by an immediate new wedding. But the death of the one

of the mate, obliges the other to respect a period of grief during which he cannot get married. (Junqueira1978). In 2003, divorced and widow women that had not get married again represented, respectively, 8.2% and 1.4% of the total number of women in reproductive period.

Voluntary Abstinence

Sexual intercourse is frequent until women get pregnant. After this, frequency decreases, then completely stops at the end of the pregnancy and restarts just when the child begins to walk. This long period of abstinence that is stimulated by older members of the group is not always followed (Junqueira 2002).

Men undergo some sexual intercourse restrictions: shamans within their initiation period and fighters during competition ceremonies.

Conception and contraception

Breastfeed periods vary a lot but are commonly long, up to the age of three. As a consequence, fertility decreases during this period (Junqueira 1978)

The Kamaiurá claims to have contraceptive herbs. However it was not possible yet to perform pharmacology analysis and enough tests to verify the accuracy of their information (Junqueira 1978, 2002). Other contraceptive methods, like intercourse interruption, are probably used in certain occasions, but are difficult to be quantified.

Abortion is a cultural practice among the Kamaiurá in certain socio-cultural situations. Women without a husband or whose husband has been away for a long period of time often practice abortions, utilizing mechanical methods or herbs (Junqueira 1978, 2002)

Infanticide is accepted when birth intervals are too short, when twins or disabled children are born, or if the relationship is unstable, for example, widow or single women, or couples that divorce before the child is born. Infanticide often follows a failed abortion attempt during the first months of pregnancy, and takes places soon after birth. It is extremely important to notice that abortion is also used as a means of family planning and to avoid the birth of an unwanted child. (Junqueira 1978, 2002)

Information obtained from Xingu Indigenous Park (PIX) health agents and from Indigenous health agents of the Kamaiurá´s village in 2003, proves that spontaneous and provoked abortions are frequent among those women. The medical records of the 73 women, with ages varying from 15 to 44 years, that were still alive in 2003, showed that there were 110.7 abortions (spontaneous and provoked) and 30.1 infanticides per thousand pregnancies. The difficult gathering of reliable information on this subject along with the long period of relationship with the Kamaiurá make it possible to believe that the above numbers have been underestimated.

DISCUSSION AND CONCLUSIONS

This study showed that, between 1948-1966, the Kamaiurá population remained stable due to high mortality rates and moderate fertility rates. From 1966 to 2002, the population growth rate was 3.5% per year, due to a continuous decline in mortality rates and an increase of fertility rates in the 1980s.

During the last decades, population growth rates higher than the one of the Kamaiurá have been observed in several Indigenous peoples in Brazil and in Latin American (McSweeney & Arps 2005). For instance, the Ikpeng and the Kaiabi, peoples living in the central and northern region of Xingu Indigenous Park (PIX), presented, respectively, a growth rate of 4.9 and 5.2% between 1970-1999 (Maia et al. 2004; Pagliaro 2002), and the Xavánte (Mato Grosso), that have grown approximately 5% in the last years of the 20th century (Flowers 1994; Souza & Santos 2001; Coimbra et al. 2002).

Kaiamurá´s mean crude birth rate, of 40 births per thousand inhabitants between 1970-2003, is lower than that of the Kaiabi, who moved to the Park after their land, near the Arinos and the Teles Pires rivers, had been invaded, and started a population recovering since the 1970s. CBR among the Kaiabi varied from 50 to 57 between 1970-1999 (Pagliaro 2002). Flowers (1994) found a CBR of 51.4 among the Xavánte from Pimentel Barbosa (MT) for the period on 1997-1990, and the estimate by Souza & Santos (2001) among the Xavánte from Sangradouro-Volta Grande, was 57.7, between 1993-1997.

One of the striking aspects of the Kamaiurá´s population dynamic was the full rationality of their reproductive process, without any cultural interference (Junqueira 1978). Examples are the Kamaiura´s traditional practices of birth control, including abortion and infanticide. This study has detected high abortion and infanticide occurrence by pregnancies among Kamaiurá´s women, with ages varying from 15 to 44 years, who were still alive in 2003. Early & Peters (1990) have also found a high abortion and infanticide proportion by pregnancies, among the Mucajai Yanomama, and estimate their impact on infant and general mortality. According to these authors, the Mucajai Yanomama classify infanticide as a terminal abortion and not as homicide. Almost all of the times, baby rejection, independent of gender, is often the main reason of infanticide, and it is related to small inter-birth interval, twins birth, physical disability, marital status, and to choose the gender of the children (Early & Santos 2005)

The increase of Kamaiurá´s women fertility levels in the 1980s can be considered another indication of the rationality of their biological reproduction behavior. Junqueira´s survey (1978), in the early 1970s, has shown Kamaiurá´s desire to enlarge their family size to an ideal number of

children, which was 3.7 for the men and 5.1 for the women. The apology to amplify or reduce their family size, representing a style of rational control. For men, the increase of family size would be related to the leadership functions, the belief that the demographic expansion was a guarantee of the survival of the group and the total fulfillment of their cultural aspirations. A big family would also represent protection and safety for the parents (Camargo e Junqueira 2005). In this sense, the noticed increase could result in a rational re-definition of the size of their families. The new pattern would also reflect better health conditions and lower infant mortality rates thanks to the sanitary and medical measures that have been implemented in a systematic way at the Xingu Indigenous Park (PIX) since 1965.

Since the 1990s, a declining of fertility and aging of the reproductive pattern have been observed, represented by the decrease of fertility rates among women up to 24 years old and the increase of this rate among the ones who belong to the 25-44 years of age group. This would indicate that, after increasing the family size to an ideal number, the Kamaiurá started to postpone marriages and pregnancies, intensifying the use of traditional birth control methods, like abortion and infanticide. This can also be confirmed by the high proportion of single women in younger age groups in 2003, as well as the progressive increase of mean age at first birth.

Fertility decline could be observed in both analysis models: by periods and cohorts. Modifications in the reproductive calendar could not be observed in the longitudinal analysis, as only one of the cohorts was completed fertility. The mean age at first birth has also increased in the younger cohorts and inter-birth intervals has decreased, what would mean that women could be postponing first birth and decreasing inter-birth intervals.

Kamairá´s women fertility levels are associated to reproductive patterns with small inter-birth intervals, extended nursing and young age maternity. This relation has been found in other Indigenous societies in Brazil, like the Mekranoti (Werner 1983), the Mucajai Yanomama (Early & Peters 1990), the Xaványte from Pimentel Barbosa (Flowers 1994; Coimbra et al. 2002) and from Sangradouro-Volta Grande (Souza & Santos 2001), the Kaiabi (Pagliaro 2002) and some Indigenous nations from the Rio Negro in Amazon (Azevedo 2004). However, Kamaiurá´s TFRs between 1980 and 2003 (6.6 and 6.2) are much lower than the ones of other Xingu peoples, like the Kaiabi (Pagliaro 2002), with a TFR of 9.5 in the period of 1990-99.

Kamaiurá´s fertility rates were similar to that of all Brazilian population from the 1950s to the 1970s, 5.8 and 6.3. At present, Brazilian TFR is 2.38 and that of the mid-west region, where Kamaiurá´s live, 2.25 (IBGE 2004:50).

The analysis of these differences leads to a discussion regarding the relation between cultural systems and demographic regimes of the Indigenous peoples, as well as facing us with a more complex debate about the rationality that these peoples conduced their reproductive process. In the 1950s, when the Kaiabi moved to the Park (PIX), they had faced a high population decrease

and in the 1970s they started an intentional process of population recovery. Like the Kamaiurá, the Kaiabi have also the knowledge about herbs, which have a temporary or permanent contraceptive effect, they practice abortion and, in the past, infanticide when the newborns were twins or disabled. In their effort to increase their population, the Kaiabi were helped by the decrease of infant and general mortality rates, besides abandoning the traditional cultural fertility controls, reducing the use of contraceptive methods and leaving aside the practice of infanticide (Pagliaro 2002). The Kamaiurá, that traditionally had few children, intentionally increased their families, expanding their population and their presence in the political scenery of the Upper Xingu. Now they would be looking for the equilibrium between their traditional family size and the size that they consider ideal to support their social and cultural organization needs.

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