

LOCATING ETHNIC CONTEXT:  
MOTHER'S CHARACTERISTICS AND CHILD MORTALITY  
IN TRINIDAD AND TOBAGO

By

KUNIKO CHIJIWA

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by

Kuniko Chijiwa

To my brother and my sister

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Abstract of Thesis Presented to the Graduate School  
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By

Kuniko Chijiwa

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Chair: Barbara A. Zsembik  
Major Department: Sociology

The objective of this study is to examine ethnic differentials in child mortality in Trinidad and Tobago. Child mortality is considered as an outcome of mother's demographic and socio-economic characteristics and quality of health care for a child. The discriminatory perceptions that incite ethnic conflicts over socioeconomic and political allocations between the two major ethnic groups, African and East Indian, were contextualized within Trinibagonian history reflecting the conditions of social inequality experienced by each ethnic group. In this study, child mortality serves as a variable to ascertain the socio-economic and cultural differences between African and East Indian for capturing a unique social stratification system in this ethnically polarized society.

The Demographic and Health Survey in Trinidad and Tobago is employed to determine whether ethnicity differentiates child mortality. The data analysis consists of multivariate logistic regression models using nine explanatory variables that are divided into three clusters; demographic factors, socioeconomic factors, and health care factors.

The analysis is organized in order to empirically test hypotheses that are derived from theoretical perspectives of Coleman's social system considering the child survivorship framework originated by Mosley and Chen. Coleman's social system theory is concerned with the balance and dynamics of competing interests in and controls over scarce resources between groups, which contribute to the construction of the social structure. In Trinidad and Tobago, ethnicity is considered as a major motive to pursue the common social and economic benefits through which we can locate the status of individuals and groups in the social structure.

Logistic regression analysis on child mortality indicates that after controlling for all demographic, socioeconomic, and health care factors, ethnicity is statistically significant; and confirms that African mothers have more than twice the higher risk of child loss that East Indian mothers have. The beneficial impacts of health care factors are found. No interaction terms between ethnicity and the three health care factors are significant, which means that each health care factor works independently from ethnicity. Thus, better health care associates with decrease of child mortality universally for all women in this nation. The inclusion of health care factors, however, widens the child mortality gap between them, implying that the ethnic gap in child mortality cannot be attributed to health care factors. Therefore, Africans continue to be disadvantaged in child mortality. There must be continued efforts toward improving the socio-economic status and quality of health care of Africans. The analysis also implies that there may be misspecifications beyond factors associated with socioeconomic standings and quality of health care that may be culturally influencing their health practices and behaviors.

## CHAPTER 1 INTRODUCTION

The objective of this study is to examine ethnic differentials in child mortality in the Republic of Trinidad and Tobago (henceforth called TT). Child mortality is considered as an outcome of mother's overall quality of life and as a variable, which can be used as an analytical category to ascertain economic and cultural differences between the two major ethnic groups, African and East Indian. This thesis utilizes a cross-sectional survey, the Demographic and Health Survey in Trinidad and Tobago, 1987 (henceforth called the TTDHS), to determine whether ethnic backgrounds differentiate child mortality among mothers in TT.

In light of the social and economic context, the study focuses on specifying the different dimensions of the concept "social inequality" and on analyzing the way in which various factors affect child survivorship. If we control for the socioeconomic determinants and health care factors of child mortality, the question raised is, whether the children of women who belong to the disadvantaged ethnic group in child mortality continue to experience higher death rates than those born to the advantaged ethnic group in child mortality. In the case where ethnic background continues to be statistically significant after controlling for key social economic factors and health care factors, the results may suggest that the higher child mortality group is subject to additional disadvantages beyond factors associated with socioeconomic standings and health care factors; there may be cultural elements influencing their health practices and behaviors.

For the objective of this study, the following specific aims were set:

- to determine whether the ethnic background of the mother significantly influences the probability of child mortality;
- to assess whether ethnic background differentiates the association between socioeconomic status and child mortality;
- to assess whether ethnic background differentiates the association between health care practices and child mortality; and
- to measure the overall magnitude of ethnic influence on child mortality in TT.

Achieving these aims may improve our understanding of the characteristics of ethnic differences in well-being and health in TT. In the multi-ethnic communities within a nation like TT, it is important to improve and renovate health care systems taking into consideration cultural and behavioral characteristics in order to reduce the inequalities in quality of health. The quality of health care for a particular ethnic group may be largely influenced by socioeconomic status, by accessibility to facilities, and by availability of the kind of medical care the ethnic group prefers.

## **Background**

### **Significance of the Study of Child Mortality**

Studies of race and ethnic differences in health have attracted the interests of researchers in analyzing health-related needs and problems in order to provide necessary and accessible health services for people from various ethnic backgrounds due to the changing population composition. Racial or ethnic background is a social construct in any kind of society and is associated with mother's absolute health status during the perinatal period, which may directly or indirectly affects fetuses, neonates, infants, and children. Because some ethnic groups are comparatively more likely to fall into disadvantaged social categories, in that they are more likely to be poor, unmarried, and

less educated, they will have higher mortality which implies that observed mortality differences are primarily compositional in nature (LeClere et al. 1997). Because of the extreme dependency, children's health and survival chances rely on their parents. Therefore, child mortality is considered as an important indicator of the well-being of a population (Birdsall 1980, Eberstein 1989, Wood and Lovell 1992, Hummer et al. 1999).

Quality of child health care and maternal education as indices for socioeconomic status have been found to be highly correlated with infant and child health and mortality (Cramer 1987, Hogue et al. 1987, Mangold and Powell-Griner 1991). Income, which is closely related to occupation and education, exercises an important effect on the ability to obtain medical provisions (Hobcraft, et al. 1984). Thus income is an influential factor in consideration of individual socioeconomic status and is an important determinant of child mortality (Gortmaker 1979, Mosley and Chen 1984, Hummer 1993). A higher incidence of poor pregnancy outcomes and child mortality among women from disadvantaged socioeconomic backgrounds has been indicated in previous research on determinants of child mortality.

Socioeconomic variables also serve as indicators of knowledge and make-up of medical services. Therefore, it is likely that people of higher socioeconomic status groups will be better able not only to afford drugs and other expensive care but also have access to valuable information on pregnancy and child bearing. They are also likely to have better housing and are more likely to be connected to water supplies and sewage systems. Education expands the role of the socioeconomic variable by disseminating knowledge on medical sanitary requirements. This knowledge can range from simple elements of child health care involving cleanliness and sterilization to more complex knowledge of

what drugs and vaccinations are required; and the ability to find and use services (Hobcraft et al. 1984). Hence, socioeconomic status, specifically income, can be considered as a pivot of human resources, however, the mere existence of differentials by income, does not constitute a satisfactory explanation of the association between these income differences and child mortality (Gortmaker 1979).

Because of the situation of children, especially new born babies, depending entirely on their parents, child mortality is considered as a sensitive measure of their parents' quality of life associated with different socioeconomic environments. Child mortality is often regarded of an extreme case of poor child health, which mirrors the parents' life, in that it is an aggregate of realities derived from the parent's circumstances and everyday choices. Although child mortality has been reduced by substantial improvements in parents' standard of living, educational attainment, and access to medical care during the recent decades, differences persist. There are a variety of latent factors related to child mortality. To reduce such inequality within a multi-cultural society, we need a better understanding of the mechanisms of the relations between ethnicity and mothers' characteristics; and of the possible reasons why specific ethnic groups continue experiencing lower quality of life and higher mortality. This understanding will help provide general health services to entire nations and the accessible health services to specific ethnic groups.

### **Ethnic Relations, Social Allocation, and Study of Child Mortality in TT**

The southernmost island formation in the Caribbean Archipelago, TT is the nation composed of twin islands. An oil- and gas-rich republic of 1.16 million people, TT is evenly split along ethnic lines with slightly less than half its people of East Indian descent (40.3%) and the same number of African descent (39.6%). The distinct ethnic identity of



each has created a modern culturally bi-polarized society within the nation. The political and economic rivalry between them has been extensively studied by researchers. Many of them found evidence of differences between the two ethnic groups in terms of their aspirations, income distribution, social mobility, political behavior, and occupational placement -- each of which has been formed in its history of development (Harewood and Henry 1985, Henry 1988, Selwyn Ryan 1991 1999, Center for Ethnic Studies 1993, Yelvington 1995). While such differences in economic superiority and social mobility between the two groups have attracted a great deal of scholarly attention, differences in health care practices derived from or largely influenced by their respective cultures which encourage or restrain their acceptance of modern medical practices, have not been well studied.

Accessibility to health care services is concerned with allocational issues within a nation, since it is considered both a universal right for the entire nation and a privilege for a people who can afford a considerably higher quality of medical care for severe injury and prolonged illness. Health care is a fundamental right when one considers that societies have a duty to preserve life and also promote quality of life. Health care is a combination of intertwined social structure, which reflects economic, social and political inequalities, and the allocation of scarce resources. Health is a condition of physical, mental and emotional well-being (Fuligni and Brooks-Gunn 2000, Singer and Ryff 2001) that all people should enjoy, hence, health should not be a privilege for the few, but like education, should be universal; everyone should have access to it, regardless of age, religion, ethnicity, culture, nationality, or social class. In this respect, health care assumes social and economic importance as various groups within society jostle for access to this

vital resource, which inevitably appears to be “scarce.” However, the right to something that is a scarce commodity in many developing countries is what creates dissatisfaction and tension among social collectives (Marshall and Mahabir 2000).

A study of health requires investigating a complex combination of socioeconomic and cultural characteristics; physical, practical, and behavioral. The cultural variations can significantly predict child survivorship, which is disaggregated by social indicators, such as place of residence, household income, and parents’ level of educational attainment. Cultural variation may characterize the socioeconomic differences between the two major ethnic groups by examining the differences in child mortality. The results from these efficient indicators, which have been historically established by interactions between the two ethnic groups, provide valuable insights into an ethnically polarized society’s stratification system.

### **Practical Significance**

Table 1 presents the causes of infant mortality and child mortality in 1988 and 1997. In both 1988 and 1997, any incidence that occurs during the perinatal period was ranked the number 1 cause for infant mortality, followed by congenital anomaly and pneumonia in 1988, infectious and parasitic disease in 1997. The trend of both the rates for infant mortality and child mortality, which have continuously shown a downward curve since 1950s, appears to be reaching a low point. Table 1-1 and 1-3 provide list of cause of infant mortality which show that problems during the perinatal period remain the top cause; moreover, the problem gains strength as a driving factor behind infant mortality: 62.8% in 1988 and 69.6% in 1997.

Informal interviews with medical doctors and epidemiological researchers in Trinidad, summer 2002, reveal current major concerns of infant mortality in TT in terms

Table 1-1. Cause of infant mortality, 1988

Causes of Death	Male	Female	Total
Certain Conditions Originating in the Perinatal Period	127	81	208
Congenital Anomalies	24	24	48
Pneumonia	17	7	24
Infectious and Parasitic Diseases	7	4	11
Signs, Symptoms, and Ill-defined Conditions	6	4	10
Injury and Poisoning	3	7	10
Accidents and Adverse Effects	1	7	8
Diseases of the Circulatory System	3	2	5
Other Protein-Calorie Malnutrition	2	0	2
Malignant Neoplasms (Leukaemia)	0	1	1
Nutritional Marasmus	1	0	1
Anaemias	1	0	1
Influenza	0	1	1
Appendicitis	0	1	1
Total	192	139	331

Source: Deaths Report 1988. Central Statistical Office, 1990.

Table 1-2. Cause of child mortality, 1988

Causes of Death	Male	Female	Total
Injury and Poisoning	13	9	22
Accidents and Adverse Effects	11	9	20
Congenital Anomalies	2	10	12
Infectious and Parasitic Diseases	7	3	10
Diseases of the Circulatory System	5	1	6
Pneumonia	4	2	6
Malignant Neoplasms (Leukaemia)	2	3	5
Anaemias	-	3	3
Bronchitis, Emphysema, and Asthma	1	2	3
Signs, Symptoms, and Ill-defined Conditions	2	1	3
Other Protein-Calorie Malnutrition	2	-	2
Meningitis	1	1	2
Certain Conditions Originating in the Perinatal Period	1	-	1
Total	51	44	95

Source: Deaths Report 1988. Central Statistical Office, 1990.

Table 1-3. Causes of infant mortality, 1997

Causes of Death	Male	Female	Both
Certain Conditions Originating in the Perinatal Period	119	96	215
Congenital Anomalies	25	23	48
Infectious and Parasitic Diseases	4	7	11
Pneumonia	6	5	11
Injury and Poisoning	3	3	6
Accidents and Adverse Effects	3	3	6
Signs, Symptoms, and Ill-defined Conditions	3	2	5
Diseases of the Circulatory System	1	2	3
Malignant Neoplasms (Leukemia)	1	-	1
Diabetes Mellitus	-	1	1
Nutritional Marasmus	-	1	1
Chronic Liver Disease and Cirrhosis	1	-	1
Total	166	143	309

Source: Population and Vital Statistics Report 1997. Central Statistical Office, 1990.

Table 1-4. Cause of child mortality, 1997

Causes of Death	Male	Female	Both
Injury and Poisoning	8	4	12
Congenital Anomalies	5	4	9
Accidents and Adverse Effects	6	3	9
Infectious and Parasitic Diseases	5	2	7
Malignant Neoplasms (Leukemia)	3	4	7
Diseases of the Circulatory System	1	3	4
Pneumonia	1	3	4
Signs, Symptoms, and Ill-defined Conditions	2	-	2
Homicide	1	1	2
Meningitis	-	1	1
Bronchitis, Emphysema, and Asthma	-	1	1
Direct Obstetric Deaths	-	1	1
Total	32	27	59

Source: Population and Vital Statistics Report 1997. Central Statistical Office, 1990.

of ethnic differences. One concern was the fundamental transformation of dietary habits, which has caused serious health related problems, especially the potential for diabetes among women during pregnancy. The other is sexual activity, which has played a major role in increasing HIV/AIDS cases in TT. Recent research conducted by the Caribbean Epidemiology Centre reported that approximately 3% of new born babies have been infected with HIV/AIDS at birth and some 5% of the causes of death among children are related to HIV/AIDS. Mother-to-child transmission of HIV/AIDS has become a major problem in TT with up to three infants being infected everyday, via this route, assuming an HIV prevalence of between 2 and 3 % among pregnant women. An estimated 1,806 adults and children were newly infected with HIV/AIDS during 2000 (Caribbean Epidemiology Center 2001). These facts are not temporal social phenomena, but rather represent the inherent socio-cultural differences between the two ethnic groups. It is believed rapid dietary habit transitions are largely due to the Americanization of food culture that affects especially the people of East Indian descent. Higher prevalence of HIV/AIDS appears among the people of African descent.

Due to the relatively lower infant and child mortality rate, the study of infant and child mortality has drawn little attention in TT. Few, if any, comparative studies on ethnic differences in terms of infant and child mortality in TT have been conducted. Although the TTDHS collected ethnic data, researchers have not attempted to use ethnicity for determining differences on health issues between African and East Indian women. The national statistical data on infant and child mortality comparing ethnic groups does not even exist, despite the fact that ethnic issues and “allocations” in every term are always prime interests among Trinibagonians. TT has a relatively more

prosperous economic environment compared to other Caribbean nations. Oil production has in fact contributed to facilitating development of medical institutions and health development programs thus, lowering the infant and child mortality rate. With the pride of not being a developing county, the TT government no longer refers child mortality as an indicator of the level of quality of life among the nation, instead, they aim to expand and upgrade the public health facilities in delivering high quality health care to every citizen. As a small and oil-rich island, TT nations shall achieve their aim in the near future. However, infant and child mortality rates are widely regarded among researchers as variable indicators of the physical well-being of children as much literature has insisted (Birdsall 1980, Eberstein 1989, Wood and Lovell 1992, Hummer et al. 1999).

To understand the differences in child survival associated with ethnicity is important for health policies and interventions. These differentials identify the highest risk group across ethnic groups, indicating the need to overcome the socioeconomic inequalities between ethnic groups, and the need for development health programs to take the inequalities into consideration. Given the numerous issues associated with ethnic strife over socioeconomic and political allocations, health care “allocation” is not exception to this; health care services should be considered a limited package of resources. Curiously, ethnic context has rarely appeared as one of the features of the country profile in research on child health and mortality (Harewood 1978, Heath et al. 1988, Marshall and Mahabir 2000, UNICEF 2003) as already mentioned. Hence this study will be a springboard for advancing our awareness of ethnic differences in terms of health, health care, and child mortality as accumulations of and confounding effects of

socioeconomic and cultural factors in TT, and also, for more complete research on the association between ethnicity, child mortality, health behaviors, and quality of life.

### **Theoretical Significance**

In the extant research of health and child mortality, socioeconomic status has been used extensively as an explanatory variable that typically measures the extent to which socioeconomic background is related with health. It is also used as a control variable in looking at other correlates of child health and mortality. Hence, taking into consideration the significance of socioeconomic influence on child mortality, and for the purpose of determining whether ethnic background overwhelms the relationships between child mortality and socioeconomic level, social stratification theory is considered first as providing theoretical guidance.

The concept of social structure, social class, and socioeconomic status are central to the study of child mortality in social sciences. The theorists of the stratification school take a structural-functional approach. While structural functionalism considers a society composed of interdependent elements such as culture, personalities, and social systems, the theory of social stratification gives more weight to socioeconomic activities than to culture and personalities. Structural-functional analysis of social stratification is concerned primarily with the roles played by such socioeconomic activities, which maintain social structure. Heavy rewards in valued goods are given to motivate individuals to perform important social functions, with the heaviest reward being given to those occupying positions of functional importance in the society for which qualifications in the society were relatively rare (Persons 1940, Davis and Moore 1944). Although functional stratification theorists take cultural variations and personalities into consideration in the frame of “functions,” they mainly hold that the cohesive and

integrative power of socioeconomic class linkages – “horizontal lines” as it were – surpasses the divisive power of the vertical lines, which divide one ethnic group from another (Braithwaite 1960). Structural functionalists insist that there must be a certain minimum of common shared values if the unity of the society is to be maintained. Hence, a structural-functional approach suggests that after controlling for social strata as measured by education and economic status, ethnic differences will not be statistically significant. Therefore, structural functionalism, in the same manner as traditional social stratification theory, chiefly attempts to describe the structure of social stratification based on the differences among people in terms of such criteria as wealth, income, occupation, education, descent, property, and prestige, and to specify the processes by which the social system is generated and maintained (Cuff et al. 1998). In their view, social system can be held together by a consensus on economic norms and values in spite of distinct cultural and ethnic diversity.

It is important that child mortality research involves investigating how levels of inequality and variation in social context affect health outcomes. Also, in multi-ethnic society, socioeconomic measurements may need to capture more of the social context than the indices of income, education or occupational position can provide. Social context is derived from such factors as community, networks, and environment that child mortality research appears most interested. The variables of socioeconomic status in explaining the difference of child health outcome, and child mortality may be described more inclusively when they involve the social context influenced by cultural context, no matter what the degree of influence is. In this sense, a structural-functional approach has the same weakness as traditional stratification theory; both overlook cultural norms in



quality of life and quality of health. Hence, the traditional stratification theory and the structural functional approach are not very useful in explaining the societies composed of many ethnic groups who devise their empirical measures either by determining the distributional characteristics of social stratification systems, or by identifying the positions of individuals, families, or other social groups in such systems (Oakes and Rossi 2003).

Culture affects our perceptions and experiences of health and health care in many ways. Health care within any group can be affected by a multitude of cultural variables; some very basic, some more complex. It is a measure of human flexibility with diverse ways and means of meeting human needs (Loustau and Sobo 1997). Hence, Oakes and Rossi suggest that it is better to start with the question, what would be an ideal socioeconomic status measure. Such a measure is described by Nock and Rossi (1979), cited by Oakes and Rossi (2003: 7-8) that, “socioeconomic status is that dimension of stratification which translates the objective distribution of social resources into meaningful perceptions of relative desirability.” This concept holds that ethnic and cultural collectivity are elements of diversifying ways by which people share and distinguish the perceptions and meanings, and means of meeting human needs related to health and “well-being.”

In reality, measurements of socioeconomic status are almost entirely represented by education and income, as well as occupational position, which are obtained from census type data due to its availability. Therefore, it may be useful to consider Coleman’s social system theory defining “the value and the role of social capital in the creation of human capital (1988, 1990),” which is also based on social stratification theory. The central idea

of Coleman's notion concerns how positions constituting social structure emerge, and how persons are motivated to occupy such positions.

Coleman sets forth three ideas. The first is material capital, which refers to owned materials such as household composition and income that are tangible and analyzable. The next is human capital, which refers to inherited physical appearance and ability as well as education, skills, abilities, and knowledge one may acquire with one's investment. The last is social capital, which includes obligations to and from others, information channels, norms, and reputation effects. To possess social capital, a person must be related to others, and it is in the potential of those relationships where social capital lies (Oakes and Rossi 2003). Portes (1998) explains that, "there is growing consensus that social capital stands for the ability of actors to secure benefits by virtue of membership in social networks and other social structures." Coleman emphasizes these networks and functions as a necessary condition for the rational action paradigm:

Just as physical capital and human capital facilitate productive activity, social capital does as well. For example, a group within which there is extensive trustworthiness and extensive trust is able to accomplish much more than a comparable group without that trustworthiness and trust (1988: S101).

The trustworthiness, in his term "the role of closure," refers to obligations, expectations, and social norms, which are largely influenced by a person's cultural perception and his experience. The existence of sufficient ties among a certain number of people guarantees the observance of norms. The collective perception of inequality emerges from the balance and dynamics of interests and control over scarce resources. For understanding the interrelationship between the socioeconomic structure and ethnicity in a multi-cultural nation, it is meaningful to consider the ethnic differences in the value of social capital and its role in the creation of human capital within a group. Oakes and Rossi indicate;

There are several advantages to incorporate social capital into a measure of SES. It provides an understanding of the variation in social contexts. --- And social capital assists in understanding the all important micro-macro (man to structure and structure to man) transitions, and thus family and neighborhood – and institutional level impacts and outcomes (2003: 777).

Thus, social capital can provide a mechanism through which behavioral norms are generated and maintained, and can promise to provide a link between individuals, society, and health as a human capital.

In previous studies, the influence of socioeconomic status on child mortality is significant (Gortmaker 1979, Mosley and Chen 1984, Cramer 1987, Hogue et al. 1987, Mangold and Powell-Griner 1991, Hummer 1993), and the mother's health care practices for her child such as prenatal care, breastfeeding, and immunization have a significant impact as intervening factors (Rosensweig and Schultz 1982, Goldberg et al. 1984, Huffman 1984, Maison et al. 1987, Trussell et al. 1991, Kadende 1994, Chaulagai 1993, Humphreys et al. 1998, Alan Ryan 1998, Forste 2001). Coleman's social system theory can provide a theoretical framework for the linkage between health and behavioral norms, individual perceptions, and social collectivities. It is also appropriate in guiding the examination of whether or not ethnic identity overwhelms the associations between child mortality and the two clusters of predictive variables, socioeconomic and health care factors, and in defining the stratification system of TT society.

### **Conceptual Framework for Child Survival**

The previous research provides evidence that child mortality is an indicator of mother's social well-being. Ultimately mother health outcomes are enmeshed in a web of causality. To comprehend the relationships between child mortality and various confounding factors, ideally, we would wish to have child specific information related to health status; illness, nutritional inputs and growth that would allow controls for health

heterogeneity in TT. Unfortunately, census type data generally does not include such information. Therefore it is useful to have a framework conceptualizing how we understand the connections among the proximate factors, socioeconomic factors (education, household composition and housing quality), demographic factors (place of residence and marital status), and health related factors (record of immunizations for children, prenatal care, place of child born, breastfeeding) which we can obtain from the TTDHS related to child survival.

The framework for the study of child survival in developing countries, which has had a major influence on the Demographic Health Survey (Boerma 1996), was first presented by Chen in 1983 and developed by Mosley and Chen in 1984. In the Mosley-Chen framework, a set of proximate or intermediate determinants, which directly link to the risk of child morbidity and mortality, are divided into five socioeconomic factors: material factors, environmental contamination with infectious agents, availability of nutrients to the fetus and infant, injuries, and personal illness control (Mosley and Chen 1984). All social and economic determinants, such as mother's education and household income, operate through the proximate determinants to affect child growth and mortality. Proximate determinant framework, however, has met criticism from researchers because it is more likely to lead to research focusing on individual level decision-making rather than on broader society processes as a result of its complex web of factors influencing behavior or analyses at other levels such as family and community (Ewbank 1994, Boerma 1996).

Since the major interest of this study is to determine the relationship between ethnic background and child mortality as a reflection of mothers' socioeconomic status, the

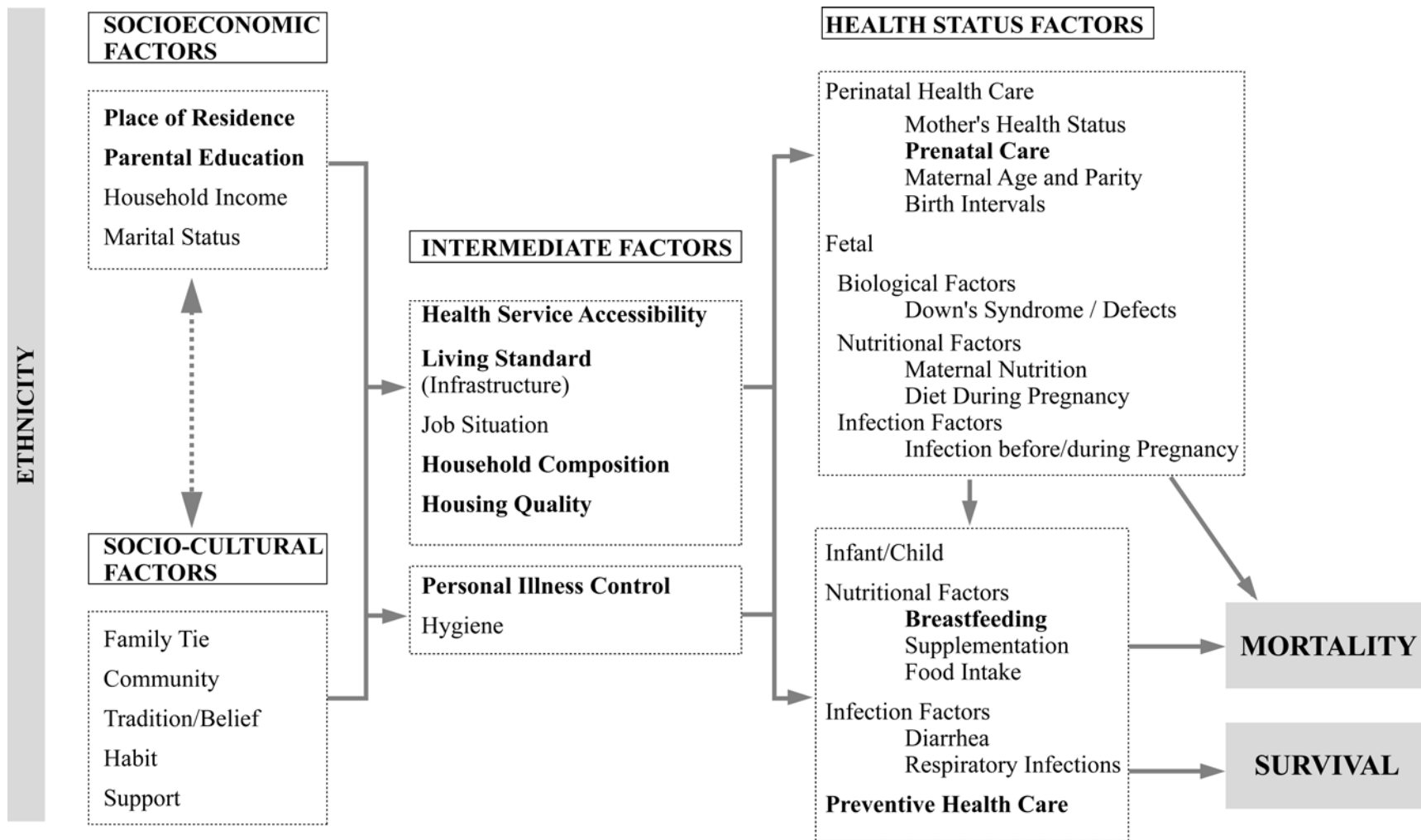


Figure 1. Conceptual framework for the analysis of the effects of socio-economic and socio-cultural factors on child survival

conceptual and analytical framework of this study needs some modifications with inclusion of factors rooted in their ethnic background. Figure 1 presents a broader conceptual framework. Socio-cultural factors, which are associated with ethnic background, serve as key covariates influencing or operating on a mother and child's health care and standards of living at both the individual and community levels. In the case that ethnic differences are not statistically significant in the presence of socioeconomic determinants and health care interventions of child mortality, then, as the United Nations reports, "the variations in mortality across ethnic and race groups probably reflect mainly differences in such factors as socioeconomic status and accessibility of health facilities and services, rather than innate differences among the groups themselves" (1985: 77). This account can be understood in the way that differences in socioeconomic status and accessibility of health facilities and quality of health services may be nested in ethnic background. If racial differences in child mortality appear, and they are statistically significant after controlling for socioeconomic factors and health care factors, then the higher child mortality ethnic group is subject to additional disadvantages beyond those associated with socioeconomic standings and quality of health care.

## CHAPTER 2 LITERATURE LEVIEW

This chapter presents a review of the literature that is relevant to this study of the relationships of child mortality and ethnic background. The first section of the chapter provides an overview of the definitions of race and ethnicity in the study of health and child mortality. The characteristics of ethnic relations in TT are reviewed through historical transformation of the islands population. TT has established segments of ethnic divisions on which the basis of national arguments over social, economic, and political allocations are laid. The second section reviews the prior studies of child mortality with emphasis on the significant roles of socioeconomic factors influencing other factors, followed by the vital statistics including child mortality rates in TT.

### **Trinidad and Tobago**

#### **Defining Differences between Ethnicity and Race**

A vast literature on health, infant and child mortality, and child survivorship has used either of two terms “ethnicity” and “race,” or both terms. It is important here to clarify the terms of race and ethnicity in the study of child mortality. Race is characterized primarily by phenotypic features but has been used to imply genetic or biological bases of health behavior or outcome (King 1997, Gutman 1999). Much research has focused upon studying racial differences between whites and blacks; however, usage of “race” in studying health has decreased with the recognition that genetic differences are greater among individuals within a given racial group than

between racial groups (Michaud et al. 2001). Cooper, an epidemiologist, conceptualized race in the study of public health and medicine;

In the biologic sense, there are not such things as races. ---. The appearance of a highly consistent pattern of differential mortality between races can be ascribed only to environmental (i.e., social), not genetic, factors. The concept race itself is a social category. Whether it be [*sic*] Catholic in Ulster, Jew in Germany, Tamil in Sri Lanka, or blacks in the United States, the definition of a population subgroup is a result of economic and historical, not evolutionary, development. Health status of racial group should be viewed within this context (1984: 722).

For Cooper, although the character of the health disadvantage particular to a racial group, e.g., higher risk of coronary heart disease for African-American, may evolve, the disadvantage itself is not likely to diminish until the intensity of racial discrimination is successfully reduced.

Ethnicity, on the other hand, is a common set of practices, values, and beliefs held by a collective and transmitted from one generation to the next (Helman 1990, Bhopal 1997). Barth indicated that ethnicity is a form of social organization and a fundamental means of ordering social life; one that relies on manipulating “cultural traits” and ideas about origin so as to communicate difference. Ethnic definitions are based on ascription and self-ascription-manipulation of identities and their “situational” character (Barth 1969).

For this study, the term “race” would be inappropriate to distinguish collectives in the contemporary TT society. The island was populated with three distinct immigrant races; Europeans, Africans, and East Indians. Europeans and Africans were differentiated in terms of color; however, no conventional color correspondence is assigned to East Indians. There is no inherent affinity between people sharing a common racial identity; rather racial identities are seen as historical products, which shape social affinities and antipathies, and thereby precipitate various social groupings and boundaries (Segal 1993).



Notably, classification by race was practically impossible and mostly meaningless because of divergent ethnic groups who were brought by the colonial government adopting a variety of immigration schemes in order to import laborers from other Caribbean islands and other countries including Portugal, Syria, Lebanon, China, and India, including former American slaves. TT has not been a racially-stratified society, but rather has exhibited an ethnic-class social structure.

Bridget Brereton (1993) shows that Trinidad<sup>1</sup> ethnicity cannot be racially-stratified society because of the following three reasons: First, Trinidad entered into its phase of plantation development relatively later.<sup>2</sup> Consequently, Trinidad's experience of plantation slavery was brief (about fifty years).<sup>3</sup> Second, Trinidad entered the post-abolition era with an unusually large "middle tier."<sup>4</sup> Third, large-scale immigration, which was a result of labor shortage after the abolition, transformed the three-tier model by introducing new ethnic groups. Ethnic differences within classes were important and each ethnic or class influenced the other in terms of culture and values in creation of "identity" in the host society (Yelvington 1993). Therefore, ethnic classification has been

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<sup>1</sup> Concerning the ethnic composition, Tobago society cannot be considered in the same sphere as Trinidad society. Tobago's population is dominated by Africans (92%). In addition, Tobago was a completely separate entity with no administrative links to Trinidad up to 1889 when Tobago forcefully was made a ward of Trinidad by Britain. Its historical experience was quite different from Trinidad's. Importantly, Tobago does not have the same history of multi-ethnic immigration as Trinidad. Therefore, in the TT history, 'Trinidad' alone is referred or each island is described respectively until 1889.

<sup>2</sup> Trinidad became a significant producer of West Indian export crops in 1784 when Britain ceded St. Lucia and Dominica islands and French planters moved on to Trinidad. Especially it was enlarged after the disturbances in St. Vincent and Grenada in 1795, most British planters moved into Trinidad which was comparatively tranquil and contained large areas of uncultivated, and unoccupied land (Rogozinski 1994).

<sup>3</sup> The years between 1784 and 1838 were the period of slavery in Trinidad. This compares to 200 years of the classic slave society such as Jamaica between 1655 and 1838, and Martinique 1635 and 1834.

<sup>4</sup> In 1838, 42% of the population in Trinidad belonged to the middle tier, while the middle class in Jamaica was 12% and 32% in Martinique.

appropriate for studying the TT society; most researchers prefer to use “ethnicity” as an analytical category embracing political, economic and ideological relations. As stated above, race has been recognized as a socially constructed phenomenon like ethnicity, therefore the usage of two terms are dependent upon the social context of each society. Hence, in this study, race and ethnicity is considered the same analytical division as a reflection of socioeconomic, cultural, political, behavioral, and health differences between collectives in a specific society.

### **Ethnic Context in Trinidad and Tobago**

According to the 1990 census, TT poly-ethnic society includes, besides the two major ethnic groups, the East Indian and African, 19.0% Mixed heritage people and 1.7% other ethnic groups composed of Spanish, French, Portuguese, Syrian, Lebanese, Chinese, Philippines and others. African and East Indian peoples have played important roles in economic, political, and cultural development in TT. The dynamics of the relationships between the African division and the East Indian division has significantly influenced the island’s transformation from a colonial society to a multi-cultural and multi-ethnic republic. The former was brought to colonial Trinidad as slaves for working on the new plantations as a result of *Cedula (law in Spanish)* of Population in 1783 substituting the extinguishing indigenous population. The latter came to Trinidad as indentured servants for, similar to Africans, working on the growing sugar plantation, and for replacing the emancipated Africans. The indenture system was merely a “new system of slavery” (Tinker 1974).

The relationship between Africans and East Indians has been described distinctively by each ethnic group. Each holds persistent negative perceptions of subordination and superordination of the other. This relationship was established at the

arrival of East Indians through two main contexts. The first is the physical and occupational isolation of the East Indians from the Africans. Many East Indians succeeded in becoming peasant proprietors and as a result the economic interests of most East Indians shifted from sugar plantation labor into small-scale cultivation on their own land. Therefore, they settled into a rural way of life, which contrasted with the lives of the Africans in the urban areas who have lived mainly within ethnic enclaves. The second is a unique circumstance in which a dividing line was drawn between aristocracies of whites and former slaves of Africans versus East Indians who formed the bottom tier of the society at the arrival. Consequently, this was the foundation that helped TT realize the relative but equal distribution of economic and political power to each ethnic group. The Africans seized political power for over 30 years since TT's independence while the East Indians became economically competitive.

“Race” first provided the basis for communal identity and resistance to colonialism. Both Africans and East Indians maintained aspects of their own cultures, distinguished themselves from their European overlords, and challenged colonialism. Each preserved many aspects of their traditional behaviors, customs, beliefs, and orientations, perhaps for the purpose of conserving their identity, in part, for protection against “external” pressures such as governmental policies, economic transitions, and offenses and censures from members of the other ethnic culture.

### **Slavery to collective identity**

Before the arrival of immigrants from India, stereotypes based on race had already emerged. These stereotypes had antecedents in Spanish culture. The initial encounter between any people of diverse cultures and civilizations of immigrants and slaves from various places, naturally gives rise to comparison by self-examination. Biases, prejudices,

and other sentiments emerge from such comparison (Moore 1995). The superiority of the “white” race became the basis for ideological justification for coloreds’ servitude. British and European intellectuals developed the idea of racial types as the most important method of classifying people. They thought mankind was divided into permanently different biological types. The doctrine of racial type and social Darwinism helped to create a climate of opinion which was hostile to dark-skinned peoples everywhere, especially when dealing with “uncertain newcomers” (Brereton 1979). Africans were regarded by the planters as being lazy and irresponsible, having a penchant for drinking and conspicuous consumption, and being prone to profligacy (Brereton 1979). Despite the acceptance by these despised Africans of many European cultural and religious practices, they successfully defended some aspects of their own culture and lifestyle in the face of determined and powerful scorn, and occasional opposition, from the ruling class. However, the Africans themselves would eventually behave somewhat like the white and white Creoles, as they developed scornful stereotypes of those who were to come after them. In 1833 the British government passed the Act of Emancipation, declaring it a law in the following year.<sup>5</sup> In the new society after the emancipation, the system<sup>6</sup> gave every incentive for the ex-slaves to leave the estates and seek independence as a small holder and a part-time wage laborer in the city (Vertovec 1992).

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<sup>5</sup> Slave-owners throughout the empire were duly compensated, while the slaves themselves were originally obliged to labor as “apprentices” for an additional six years. The requirement of apprenticeship was halted in 1838 finally, and over 20,000 slaves of African descent were freed in Trinidad (Williams 1962, Brereton 1981).

<sup>6</sup> After slavery was abolished in 1834, planters tried to maintain labor in their sugarcane fields offering a rate of wages far higher than in the other British West Indies, as well as rent-free huts. These wages for field labor between 50 and 65 cents per task or per day were higher than any paid in Trinidad for a century to come – in 1938, unskilled labors in sugar were earning 35 cents per day (Brereton 1981). Despite the high wages, freed Africans were reluctant to settle far in the interior at a distance from existing centers of population with their schools, churches and rudimentary social amenities and Africans themselves pursued

When the large indentured labor population from India arrived, those ethnic groups already living in Trinidad took care to distinguish themselves from these newly arrived East Indians. Brereton points out that “there is evidence that a “Creole identity” shared by local white and educated colored and blacks was emerging in Trinidad, a Creole solidarity in opposition both to the British representatives and to the Asiatic immigrants” (Brereton 1979: 208). East Indians were especially singled out in this process of hostile ethnic stereotyping. After all, they looked different, dressed and behaved oddly, spoke different languages, ate strange foods, practiced queer customs, and worshipped weird gods. In every sense, they seemed were in striking contrast to “Western” ways.

As the immigrants came from widely different regions of the Indian Subcontinent, the newly created migrant world in Trinidad was characterized by substantial differences in culture<sup>7</sup> and economy. The remarkable heterogeneity of the migrant population and their broad range of language were multiplied by distinct dialects due to smaller sphere where they lived (Vertovec 1992). Initially, the internal heterogeneity of Trinidadian society was not restricted to African/East Indian differences. There were strong internal differences within the East Indian group itself. Some of these differences were religions, distinguishing Hindus from non-Hindus. But even among the Hindus themselves, who were 85% of the total immigrants from India, there were regional and cultural differences such variables as languages and caste systems. These varied backgrounds contributed to the demise of a significant portion of caste foundation and caste-based ideology.

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a legal or nominal freedom. A large number of Africans entered the skilled trades and moved to Port of Spain, San Fernando, and larger villages. These are now considered African dominated areas.

<sup>7</sup> Including language and dialect, dress, cuisine, caste composition and structure, architecture and village layout (Vertovec 1996).

Therefore East Indians had not simply conserved pre-immigration cultural forms but have created a series of syncretic or other modified cultural forms. Regarding the East Indians' position within Trinidad's social, economic, and political structure, new types of relationships among East Indians and with other ethnic groups have periodically worked to produce changes in the conservation of East Indian culture. As the strong internal differences among immigrants from India lessened, simultaneously, the strength of the African/Indian differences became more evident.

These subjective ethnic stereotypes had a solid grounding in an objective emergent division of labor: whites as plantation owners; Chinese and Portuguese in trading occupations; Africans and coloreds moving into the professions and skilled manual occupations; and East-Indians were almost completely in agricultural occupations. Because of these occupational differences, the two largest groups, Africans and East Indians, were separated geographically as well as culturally. Many Africans have been urban-based in two cities; Port-of-Spain and San Fernando, while East-Indians have lived in the rural central and southern parts of the island with a strong core found in the plains of the sugar belt. Therefore, a pervasive and fundamental physical, geographical separation characterizes Trinidadian society, as Premdas describes as "the Creole-cum-colored portion versus the Indian portion" (1993: 100).

Hence, "social confrontation" has involved the "indigenization" process of several migrant groups, divided first by race then by ethnicity, language and religion, plantations, small-holdings, villages and growing towns. It has been characterized by the infighting of these groups, both within each group and against other groups. The ethnic diversity may have encouraged East Indians to seek common ground. Interestingly, this situation has

not been influencing only the East Indian community but also the African community. This situation is vividly remarked by an Afro-Trinidadian friend of mine. “If we wouldn’t have Indo-Trini, we wouldn’t be the Afro-Trini. If we were not here, they were not East Indian, we may be complementary to each other...”

### **Ethnicity and class consciousness**

Trinidad’s situation as a colony under foreign control changed when partial self-government was instituted in 1925. The first political organizations in TT developed in the 1930s, when a worldwide economic depression spurred the formation of labor movements. Full adult suffrage was introduced in 1946. In 1956 the People’s National Movement (PNM) was formed by Dr. Eric Williams, who became the first Prime Minister in 1958, drawing on the support of mainly African elements of the population. The opposition<sup>8</sup> drew support from the East Indians.<sup>9</sup> The PNM continued to win elections. By the 1970s, the island’s industrial structure had shifted from an agriculture-based economy to an oil industry-based economy<sup>10</sup> that produced revenues for the government. It has been said that revenues from oil exports were used to assist African population subgroups who were identified as underprivileged. Members of the East Indian group perceived that most of the funds went to poor Africans in urban areas. East

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<sup>8</sup> The Peoples Democratic Party (PDP) was established in 1953 by Bhadase Maraj supported by the rural Hindus.

<sup>9</sup> In 1960, the composition of the population was African 43.3% and East Indian 36.5%. An East Indian majority was first noted in the 1990 Census.

<sup>10</sup> The chief domestic beneficiary of oil income is the central government, which receives oil revenue through taxes, royalties, and ownership. (In Trinidad and Tobago 28% of the industry was in the government’s hands in 1996). The resulting expansion of the public sector crowds out the private sector. Then, many of the public sector commitments made during the boom were difficult to reverse and so caused delays in adjustment when the boom ended. In Trinidad, the public sector accounted for 30% of GDP, (compared to the other resource-supplying nations such as Chile 8%, and Argentina 18%, the public sector is unfavorably large), 30% of total employment, and over 50% of salaried employees. (World Bank 1996).

Indians further concluded that urban Africans benefited more from job opportunities provided by the government.<sup>11</sup> In this way, government policies contributed to inter-ethnic tensions. The ethnic “competitions,” which began with the importation of forced and indentured labor early in Trinidad’s history, were kept in force when Williams provided special attention and assistance for Africans, who he considered to have suffered past discrimination. This process, termed a “symmetrical political patronage,” led to feelings of alienation on the part of other ethnic groups (Center for Ethnic Studies 1993).

The traditional view differences in occupations persist today, based as it is in certain objective facts. Rural-based East Indians have the lowest income. People of African and mixed heritage have reached the mid-point of the income distribution while Whites and Off-Whites<sup>12</sup> have the highest income (Harewood and Henry 1985). However, the actual situation is more complex than these general statistics suggest. For example, government workers mainly earn more than those in private enterprise,<sup>13</sup> a fact that favors Africans. On the other hand a majority of millionaires are Syrian or East Indian. In addition, the Center for Ethnic Studies reported that there is no sufficient

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<sup>11</sup> The PNM maintained a patronage network targeted at Africans, especially urban ones. One method was the establishment of the government's Development and Environment Works Division (DEWD), which employed workers for road construction and maintenance. Almost every DEWD project was aimed at African areas and hired African workers (Yelvington 1995). Percy C. Hintzen (1989) and Steven Vertovec (1992) stated that patronage was accomplished most effectively through the state sector, and the PNM's industrial strategy was aimed at urban Africans, at the expense of agriculture, the livelihood of many rural East Indians. With the end of the oil boom, the oil money ran dry and the subsidies were removed. Ironically, this sudden recession made Africans suffer severely because the majority work for the public sector.

<sup>12</sup> Off-White is applied to immigrant groups, essentially, who are perceived as very close to White in skin color, but are seen as less powerful politically. This category includes Portuguese, Syrian/Lebanese. Chinese are treated as such by other groups.

<sup>13</sup> An average monthly wage in the public sector is higher (TT\$ 2,300) than that of in the formal private sector (TT\$1,500) (World Bank 1995).



evidence for the African division's heavy dominance and underrepresentation of East Indians in the public sector (1993). "Race" was identified as a factor influencing promotion in some of the public companies surveyed however, "racial discrimination" was in fact a tendency towards speculation that glided easily into charges and counter-charges of discrimination (Center for Ethnic Studies 1993).

Given such disparate facts, it is not easy to determine which group is actually better off. Objective complexity notwithstanding, the subjective perceptions remain among the people. The East Indians believe the Africans benefit most from the government, while the Africans think the East Indians discriminate against them in the formal private sector. Selwyn Ryan indicates that perceptions of economic status among the ethnic groups tend to be viewed from an individualistic point of view (1991). He explains, "all groups (with the possible exception of the Syrians) believe that they are economically dispossessed. The latter however also believe that they are dispossessed in the sense that they have not been given the social recognition they deserved and that they are still the butts of ridicule" (Selwyn Ryan 1991: 78). Both groups are concerned about the economic "gains" made by "the other" group, creating in effect a zero-sum game between them.

Conflicts between the two groups over education, which is one of the most important avenues of upward mobility in a developing ethnically heterogeneous society is an example of the compound product of the cultural confrontations. Religion, especially Christian missionary, which represented the western culture, played a significant role in establishing educational facilities in TT. Religious conversion was practiced among some East Indians in order to gain material benefits, namely, education. When East Indians entered Trinidadian society, they were considered by the host society a lower class and

minority population. This stereotyping by religious denominations led to the creation of separate school facilities and to the subsequent PNM policy dealing with the location of schools, the language of instruction, religious orientation, the admission of students, awarding of scholarships, and treatment of teachers that led to the establishment of the East Indians' denominational schools.

These dynamics injected an element of ethnic exclusiveness into the educational sector (Gosine 1986).<sup>14</sup> The feeling of East Indians that East Indians had of being educationally disadvantaged continued under the PNM administration. Many East Indians believed that they would not receive a fair share of educational benefits especially in terms of the awarding of scholarships and the hiring and promotion of teachers. Considering the geographical advantage of Africans, namely, their presence in urban areas and consequently their greater proximity to the majority of schools, the educational disadvantages of the East Indians might not derive from any deliberate action on the part of the government. Did the PNM intentionally favor its own ethnic group and slight the interests of the East Indians within the educational sector? This question is hard to answer empirically and objectively. However, the subjective perceptions of intentional educational discrimination against East Indians is obvious and simple common sense to the people of Trinidad, especially to members of the East Indian group.

The empirical evidence indicates that by 1980s, Africans and East Indians had leveled in terms of group income (Yelvington 1995). Since 1996, political power has

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<sup>14</sup> East Indians could not receive a fair share of educational benefits under the PNM administration. The educational institutions, by and large, are located in such areas where they best suit the convenience of black students in areas inhabited predominantly by that race. The participation of East Indian students in higher education causes African students to regard them as socio-political threats. Similarly, East Indian students feel threatened by the gains of the African students whom they see as the recipients of government support (Gosine 1986). On the other hand, some recognize that the PNM's education strategy contributes to both ethnic groups (Selwyn Ryan 1991).

oscillated between PMN and the United National Congress, supported by East Indians. It may be true that this closeness and their juxtaposition could cause them to be competitive with each other over allocation of resources, and through a class-consciousness – that is, each group thinks it is superior.

### **Properties of Child Mortality**

#### **Difference between Infant Mortality and Child Mortality**

In analyzing mortality in the postnatal period, the age at which mortality is measured calls for an important consideration because of “the social and biological factors that affect mortality vary by the age of child” (Wood and Lovell 1990). Practically, analyses concerned with the causal pathways of postnatal deaths are hitherto divided into two groups; infant mortality (under 1 year) and child mortality (1-5 years). This dichotomization is mainly distinguished by the terms of cause of deaths, and two sets of causes are designed as endogenous and exogenous. Generally, the former class of death is presumed to arise from the genetic makeup of the infant, the circumstances of prenatal life, and the conditions of labor, which are difficult to prevent or treat in the present state of knowledge. The latter class is presumed to arise from purely environmental or external causes, i.e., it is related to the contact of the infant with the external world. Exogenous mortality primarily includes infections and postnatal accidents, which are relatively preventable or treatable (Shryock et al. 1976). Considering the statistical facts that the highest risk for infants is under one month of age – over 95 percent of infant deaths (Shryock et al. 1976), causes of infant deaths are mainly considered endogenous, or at least the proportion of the endogenous causes is larger than that of exogenous causes for the infant deaths. On the other hand, child mortality is determined by the combined effect of both endogenous and exogenous factors, and it is

also more sensitive to a broad range of environmental conditions (Wood and Lovell 1990).

Related to the age issues stated above, there is another dichotomization in a wide range of demographic research. Prior research has indicated that the nature of child mortality in regard to emphasizing the importance of sociological research in illustrating how various factors causing child mortality shape the risk of child death. Therefore, research concerned using the causal pathways of child mortality can be dichotomized. One view focuses on the direct impact of social and economic environments of the risk of child mortality and the other view focuses on the impact of variations in health services. The relationship between socioeconomic environment and child mortality is captured in a remark by Wagner, a neonatologist and perinatal epidemiologist, quoted by Gortmaker and Wise (1997: 156);

Infant mortality is not a health problem. Infant mortality is a social problem with health consequences. It is analogous to traffic accident mortality in children: the first priority for improving traffic accident mortality in children is not to build more and better medical facilities, but rather to change traffic laws and better educated drivers and children. In other words, the solution is not primarily medical, but environmental, social and educational. The same is true for infant mortality: the first priority is not more obstetricians or pediatricians or hospitals, nor even more prenatal clinics or well-baby clinics, but rather to provide more social, financial and educational support to families with pregnant women and infants (1997: 156).

The powerful role of socioeconomic forces in the prediction of disparities in infant mortality is stressed by this perspective.

The other view focuses on health services. Control of childhood diseases is typical of health services, which can be provided equally to nations to improve health care technology. But the relations between child mortality and quality of health services cannot inclusively be studied without the elevation of social pathways. Especially, health care technology or westernizing health care may widen the disparities between “haves”

and “have-nots.” This account is expressed by Gortmaker and Wise indicating that the trends of decline of child mortality are mainly due to innovations in health services; “such technological change also creates new opportunities for socioeconomic differentiation as life-saving therapies or preventive interventions potentially are made available only to the economically advantaged” (1997: 148).

Combining the two categorizations suggested above, the research spheres for infant mortality and child mortality seem to have been closer. As researchers have become more interested in the linkage between social inequality and mortality outcomes, they begin to emphasize the diverse mechanisms through which this relationship is manifested, as well as how various mortality influences vary in their causal priority and proximity to the biological event of death (Eberstein 1989). Postnatal mortality, including both infant and child mortality, represents the cumulative effects of all factors characterized by both endogenous and exogenous factors, and by pathways affecting postnatal mortality, socioeconomic circumstances, and health care accessibility. Moreover, child mortality may be a more intricate composite of a number of component rates, each with its own set of relationships with social factors, health services and individual mothers’ health orientations. This is why demographers and sociologists have been interested in using child mortality to explain the social inequality and social stratification within a society, and the primary reason for this study, which uses child mortality as a general term including both infant mortality and child mortality.

### **Determinants of Child Mortality**

Demographers and public health scientists have developed and shared the common perception of the contribution of socioeconomic development and the medical and primary health services offered by public health programs in the reduction of mortality

(Preston 1975, Caldwell 1979). Differentials in child mortality between population groups have been a constant topic to social scientists. The most common variables used in the study of child mortality differences between sub-groups within a nation are socioeconomic standings as the main effect or as surrogates for other variables about which information was not directly available (Hobcraft et al. 1984). The primary reason is because the extreme dependence of children especially under 5 years old makes child mortality a sensitive measure of the quality of life. As Gortmaker (1979: 281) explained, “infants exercise no responsibility for their environment and health status, and thus an infant’s own motivations and actions have little impact upon its chances for survival; most influences should come from its parents and the surrounding environment.” Hence, child mortality has been considered as a mirror of the quality of given circumstances for each child, and the child mortality differences among the people have a significant role in measuring the disparities between population groups within a nation.

### **Socioeconomic and Demographic Variables on Child Mortality**

#### **Income**

Income is an influential factor in consideration of individual socioeconomic status and an important determinant of child mortality (Gortmaker 1979, Mosley and Chen 1984, Hummer 1993). Higher incidence of poor pregnancy outcome and child mortality were found among women from disadvantaged socioeconomic backgrounds. The mere existence of differentials by household income however, does not constitute a fully satisfactory explanation of the disparities of child mortality in income levels as well as educational levels. There are a variety of proximate and intervening factors related to infant mortality that are also associated with income and education and thus, need to be

controlled. Such factors fall within a context that rationalizes tests of relationships between socioeconomic status and child survivorship.

### **Maternal education**

Mother's socioeconomic standings are represented by several factors such as education, household income, work situation, occupation, and quality of housing. Maternal education as a socioeconomic indicator appears most frequently in studies of child mortality, "because other measures that might be preferable, such as family income, are not available in the vital statistics records that constitute the basis of most research in this area" (Hummer et al. 1999: 1087). Also, maternal education has drawn a wide range of research interest because it is the most relevant and intuitive from the standpoint of child health policy relating to education-conducted use of health services. Although the results analyzing the connection between education and child mortality vary in strength of impact on child mortality outcome (Benyoussef and Wessen 1974, Caldwell et al. 1983, Hobcraft et al. 1984, Ce Chen and Williams 1997), the most valuable nature of education as well as household income are that they appear to be the most common variables tapping into not only the cohort of socioeconomic factors such as work situation, occupation, and quality of housing but also into almost all explanatory variables of child mortality. If the magnitude of education as a socioeconomic variable on child mortality varies in each society or each cohort within a society, the covariates could shape and state the important variance explaining each society's characteristics.

### **Marital status and residential characteristics**

The influence of demographic characteristics such as residential (urban-rural) and marital union characteristics on child mortality are often examined with socioeconomic status. Mothers' place of residence (urban-rural distinction) is used as a proxy measure

for living conditions to illustrate both public and medical health provisions. This is due to the lack of infrastructure such as electricity (especially for refrigerator), drinking water, non-drinking water (for flush toilet), and sewage, and access to basic health care facilities which may be life threatening to the children in rural areas (Suwal 2001). Urban residents were found to have better conditions compared to rural residents. This is especially likely given the confounding of many other socioeconomic attributes with place of residence. However, in some cases, the residential differences appear to show internal differences. Compared with the homogeneity of experience for urban residents, mortality in the traditional rural areas varies widely even between sub-groups with similar attributes (Hobcraft et al. 1984).

The association between marital status and child mortality is examined by using various controls such as education (Keller 1978), race (Cramer 1987, Eberstein 1989), race and age (Gee et al. 1976), and race and intervening factors (Eberstein et al. 1990, Hummer et al. 1999). The magnitude of marital status on child mortality differs, depending on the covariates, but these studies found that significant interactions, between marital status and education, and race and unmarried status, are associated with higher child mortality. However, Cramer indicates that; “marital status,” similar to residential and age, “may not be an independent risk factor. ---. In general, it is not known which social factor or combination of factors is causally responsible for the observed group differences” (1987: 299). For example, children born to unmarried women may be at higher risk for mortality as a result of inadequate familial resources rather than marital status per se (Eberstein et al 1990). Therefore, “marital status” is considered to be substitutive to the level of “quality of life” of mothers. We may, however, have to be



careful that marital context varies in each society. The demographic factors as such mentioned above are generally attributive covariates.

### **Intervening Health Care Variables in Relation to Socioeconomic Variables**

The association between child mortality and maternal education has been the most common finding in the child mortality literature as mentioned above. Several lines of inquiry on education's direct and indirect function on child survivorship have been determined. There are two major directions of study in the association between education and child mortality; the first linking to economic status, and the second linking to skills and health care practices. The former is more likely conditional and influenced by her familial construction. The economic status of married women is largely determined by her husband's educational achievement and his occupation and employment status. Paternal education captures variation in household wealth or disposable income, and the relation between child mortality and education is accounted for by the various adopted indices of household economic condition (Hobcraft et al. 1984). Father's education also influences attitudes, preference, and choice of consumption goods, including childcare services. Therefore, "in many cases correlations between health effects and educational level of fathers (or other non-childbearing, economically productive adult members in a household) largely occur because of operations on the proximate determinants through the income effects" (Mosley and Chen 1984: 34).

While paternal education has a role in limiting or facilitating the orientation and selection of mothers' way of life and mothers' characteristics, maternal educational level is more likely linked to skills in health care practices and health orientation directly. Because of biological links between the mother and infant during pregnancy and lactation, mother's health and nutritional status influence the health and survival of the

child (Mosley and Chen 1984). Studies by Benyoussef and Wassen (1974) and Boerma (1990) show that better educated mothers more commonly use maternal and child health services than less educated mothers. Furthermore, Streatfield, et al. (1990) indicate that educated women have greater awareness of correct immunization schedules. This can be another dimension of formal education, which Caldwell has argued, that the significance of maternal education's role is to change traditional patterns of familial influences so that women may improve their understanding of the importance of using modern medical services (Caldwell 1979, Caldwell et al. 1983). Mother's educational level can affect child survival by influencing her choices and increasing her skills in health care practices, such as nutrition, hygiene, preventive health care, and disease treatment.

### **Prenatal care**

Prenatal care has generally been considered to contribute to good birth outcomes and also as a predictive variable of child health and child mortality. The adequacy of prenatal care – as evidenced by prenatal checkups, the presence of trained health professionals, whether doctors, midwives, or traditional birth attendances during delivery, tetanus toxoid immunization and nutritional supplementation, etc., – has a direct impact on maternal morbidity and mortality (United Nations Population Fund 2000).

Prenatal care is considered as “a package of necessary services” (Shiono and Behrman 1995). Therefore a number of benefits accrue; such that prenatal visits play an additional role: to enable women to obtain general information on infant and child health care as well as specific medical attention. Several recent studies have examined the relationship between race/ethnicity and child health and mortality while controlling for limited sets of confounding factors, such as the risk of infant birth weight, with household income and education (Kleinman and Kessel 1987, Collins and David 1990). These

studies indicate that the interrelationships among prenatal care, birth weight, and child mortality document the importance of socioeconomic and other social variables on the probabilities of low birth weight and the risk of child death. The relationships between prenatal health care and maternal education have been found to be highly correlated with each other (Cramer 1987, Hogue et al. 1987, Mangold and Powell-Griner 1991). Socioeconomic variables, household income and education, serve as indicators of knowledge, amount of medical services and level of household income. These variables exercise an important effect on the ability to obtain medical provisions. Echeverrria and Frisbie point out the potential of prenatal care practice: an increased utilization of a wider array of postnatal health care services was found among mothers who practice an adequate level of prenatal care (2001).

### **Preventive health care**

Represented by breastfeeding and timely immunization, postnatal care includes feeding children nutritious solid food and sanitation, and a hygienic way of living is vital in preventing possible postnatal child deaths. Child immunization is one of the health systems' principal interventions aimed at lowering child mortality. Preventive health care has been improved dramatically since the Second World War such that relatively rapid child mortality reduction in mid-20th century was primarily attributed to this health technological improvement (Suwal 2001). The evidence, which supports the relationships between accessibility to health services and child mortality, has been provided by Maison and Sekeito (1987) and Chaulagai (1993). However, according to Cleland and van Ginneken (1988), the nature of the interaction between accessibility and utilization of health service influencing the reduction of child mortality is context-sensitive. Its nature depends mainly on the level of development of the health infrastructure. Education and

geographical accessibility are substitutive, but maternal education has more potential to compensate for the disadvantage of mothers' lack of accessibility to health services (Rosensweig and Schultz 1982, Kadende 1994, Bicego and Boerma 1996). Education equips mothers with knowledge of healthy living and encourages them to practice proper health care.

Research examining the relation between ethnic groups and receipt of preventive services, which are usually in the form of care such as pap smears, breast exams, mammography, and cholesterol screening, found general differences in female preventive health care use among racial and ethnic groups. Furthermore, each ethnic group has a tendency to receive a particular preventive service (Corbie-Smith et al. 2002). For narrowing the differences by race in preventive health care practices, it is necessary to address racial differences in disease outcomes. Simultaneously, we may consider the influence of a certain ethnic group's common tendency to receive health care as one of their child care practices. The more mothers receive preventive health care within an ethnic group, the more they become aware of the importance of having their children receive immunizations appropriately.

### **Breastfeeding**

Breastfeeding has been emphasized because of its significant influence on the well-being of children. Children's health advantages are conferred by breastfeeding and, conversely, there are detrimental effects of failure to breastfeed on the child deaths. A large body of evidence indicates that children who are bottle-fed from birth run a higher risk of health and developmental problems than do breast-fed children (Goldberg et al. 1984). The relationship between breastfeeding and child mortality has been examined mainly with mothers' socioeconomic characters, education and income which are

considered as having strong predictive power, whether or not a mother breastfed. Mothers with a higher formal education and a higher monthly income are more likely to breastfeed (Goldberg et al. 1984, Huffman 1984, Trussell et al. 1992, Humphreys et al. 1998, Alan Ryan 1998, Forste 2001). Marital status is also strongly associated with breastfeeding; mothers being married are more likely to breastfeed than mothers having other union status (Hirschman 1981, Forste 2001) which indicates that the support of the child's father is important in the breastfeeding decision.

Residential differences are also predictive of breastfeeding. Usually breastfeeding is considered to affect child mortality most strongly in the cities (Trussell et al. 1992). Some findings indicate that urban settings are negatively associated with mothers' breastfeeding decisions, due to general perceptions toward bottle-feeding, which is considered as a modern, adequate, and convenient method. Additionally, for mothers living in urban area, it is rare to have role models of breastfeeding practices (Huffman 1984) suggesting urban-rural cultural differences. Provided that living conditions in urban areas have been improved such as access to safe drinking water, medical facility, and health information, the impact of breastfeeding on child mortality has been reduced in cities. Instead, Goldberg, et al. found that accessibility in rural areas have been left as it is or is still behind the urban areas, therefore, association between breastfeeding and child mortality becomes stronger and excess urban areas; a higher mortality risk is experienced by the non-breastfeeding division in rural areas (1984).

Not only is the breastfeeding variable considered an indicator of quality of childcare, but also it may explain individual mothers' perception of "time," which is strongly influenced by their daily life orientation and its tempo and general health

attitudes and beliefs of the mother and those of her social network (St Clair PA et al. 1989, Butz et al. 1993). Mosley and Chen (1984) mention the importance of a mother's "time" caring for her children and maintaining their living circumstances such as prenatal visits, breastfeeding, food preparation, sanitation, and sickness care. Childcare time often competes with time needed for income-generating work. They note that, "A mother's time may also be required for other economically productive activities that may or may not be related to child health" (Mosley and Chen 1984: 35). The physical accessibility to (modern) health services is also largely determined by mother's socioeconomic standing; thus, issues of accessibility to health institution and services extend to the variability within education. Greater physical access to health services improves survival to a greater extent among the children of less educated women than for children of more educated women (Katende 1994, Bicego and Boerma 1996).

### **Type of place where the child is born**

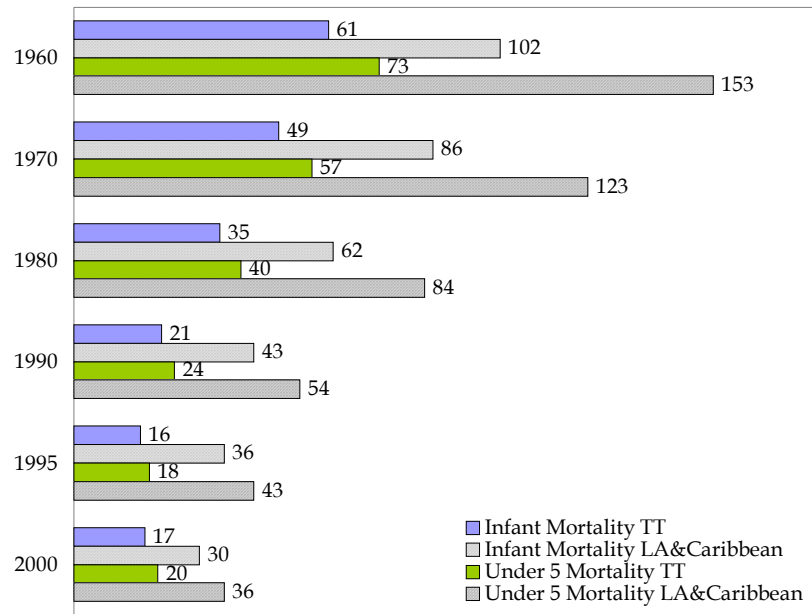
Place of delivery; whether or not children were born in a medical facility or private home that may be unsafe and unhygienic, have been shown to influence child survivorship. Whether or not the baby was delivered in a hospital serves as one extreme indicator of lack of medical care (Gortmaker 1979). For mothers, the high risk of neonatal tetanus deaths was found to be associated with home delivery (Foster 1983), and the births taken place at a medical center and assisted by doctor, nurse, or midwife are found to have a significantly lower risk of child mortality (Suwal 2001). Although traditional birth attendants still deliver a considerable proportion of newborns in developing countries and rural areas including middle developed countries, the proportion has shown a tendency to decline (United Nations Population Fund 2000).

Having provided the persistent interrelations among socioeconomic background, namely, income level and educational achievement, and demographic and health related factors, it is evident that these factors do not independently determine child survival chances. Eberstein et al. state that, “there are reasonable a priori theoretical grounds to expect interaction among them – that the effects of some of the variables may vary depending on levels of the others ” (1990: 414). The effective variables and their strength may also vary according to the social system of a given society. For a better understanding of the association between socioeconomic factors and child mortality, recent child mortality literature includes health related factors such as prenatal health care, preventive health care, and breastfeeding which can indicate mothers’ childcare orientations and cultural influence derived from their race and ethnic background. On the other hand, recent studies in the United States indicate that race is a modern social stratifying agent coinciding with the emergence of slave trade. Hummer stated that “such destructive exploitation and reasoning served as fertile ground for continued inequalities in resources, status, power, and health between socially defined group” (1993: 533).

The phenomena remain at present and there is a general consensus that race and ethnicity, as social stratifying agents, continue to affect child mortality (National Research Council 1989, Hummer 1993, Mullings et al. 2001). As seen in the ethnic context in the TT society, which embodies a number of dimensions that are indicative of socioeconomic status, women who are from disadvantaged socioeconomic background and from an ethnic group which experienced continued lower socioeconomic status in TT should be considered higher child mortality risk group.

## Infant and Child Mortality in Trinidad and Tobago

Infant and child mortality rates from 1960 to 2000 are presented in Figure 2. In 1990, 21 out of every 1,000 babies died before reaching the first birthday while 24 per 1,000 died before the fifth birthday (UNICEF 2003a). The decline of the infant mortality rate from 61 to 21 deaths per 1,000 births between 1960 and 1990 represents a 65.6% drop. An even greater decline of 72.6% is seen for under five mortality, which decreased from 73 to 20. UNICEF provides the latest under five mortality rate of 20 and infant mortality rate 17.<sup>15</sup> These figures represent a very low level of mortality, approaching that



Source: UNICEF Statistics. UNICEF End Decade Database – Child Mortality. <http://www.childinfo.org/cmr/revis/db1.htm>, <http://www.childinfo.org/cmr/revis/db2.htm>.

Figure 2. Infant and under 5 mortality in Trinidad and Tobago and Latin American and Caribbean, 1960 to 2000

<sup>15</sup> UNICEF calculated infant and under five mortality rates based on an indirect estimation technique, the Brass Method. The data used in the estimation are the mean number of children ever born to five year age groups of women aged 15-49, and the proportion of these children who are dead, also for five year age group of women. Hence, the infant mortality rate indicates the probability of dying before the first birthday. The under five mortality rate is the probability of dying before the fifth birthday.



of developed countries. By comparison, the infant and child mortality rates in TT are relatively lower compared with the other Caribbean and Latin American countries as a whole.

A previous study by Heath et al. (1988) using TTDHS indicates the socioeconomic characteristics of child mortality. The results show that both infant and child mortality are lower in rural than in urban areas. This somewhat unexpected finding may reflect the homogeneity of the socioeconomic conditions in the society: there is difficulty in distinguishing urban from rural areas largely due to the developed transportation systems throughout TT. As expected, mortality for children aged 1-4 decreases as the mother's education increases. However, infant mortality appears highest among the best-educated women. It is most likely because the rates for the highest and lowest education groups are based on a small number of births.

The ethnic differences in child mortality in TT are gathered from a fertility study in TT by Harewood (1978), a comparative study on child mortality between three Caribbean nations, TT, Guyana, and Jamaica, carried out by Ebanks (1984), and the survey on postnatal practices in Trinidad by Mahabir (1997). According to Harewood who conducted research in 1970, the fertility was higher in the East Indian division compared to African division -- the gap between the two groups was radically narrowing over time and the situation is reversed in 1990 census. This is probably due to the natural relationship between total children ever born and child mortality though, at the time of Harewood's research, East Indian women were more likely to have experienced a child loss. Mahabir reports that the infant mortality was higher among East Indian women than Africans with respective proportions of 8% and 5% in 1994. Perhaps this is because of

the higher concentration of the East Indian population in rural areas. Generally, more lower income families are found in rural areas than urban areas and Ebanks' findings correspond to the disadvantaged income situation in rural areas indicating higher infant mortality among East Indians in rural areas. Considering the account of Mahabir, the higher infant mortality in the East Indian division may be situational.

Relatively lower child mortality in this nation is supported by such indicators as large immunization coverage (DPT, Polio, measles), higher rate of perinatal care use, and higher rate of receipt assistance at delivery with respective proportion of 90% (1995), 97.6% (1987), and 99% (1997) (Pan American Health Organization et al. 1998). However, UNICEF (2003a) reports that only 1.8% of children under the age of four months were exclusively breastfed. This is considerably lower than expected. Even though immunization is free in all health centres (public sector) and the large immunization coverage is reported, UNICEF indicates that the proportion of children who have had all eight recommended vaccines in the first 12 months of life was estimated to be relatively small amounting to 7.4% (2003a). Mothers' levels of formal education differentiate the rates of immunization coverage for their children, that is between mothers who had secondary or higher education and those who had only primary education with respective proportions of 18% and 7.1%.

There are both public and private health care systems in TT. Health care is provided privately for varying, but generally high rates of payment. Free health care is provided by various state-owned and controlled public health facilities. Public facilities include general hospitals, located in the main urban areas, and health centers, located in all eight counties of the twin-island state. There are 101 health centres in total, as of 1996

(Mahabir 1997), under the control of the Ministry of Health, which plays a key role in the delivery of health care to the nation. In this relatively small country, with good internal transportation, many of the same doctors at the public facilities are involved in private practice: many doctors work at public hospitals and operate their own clinics. Health care delivery at state-administered institutions has been a contentious issue among members of the public and among the providers themselves. The general population has vociferously expressed numerous complaints condemning the quality of service offered at public health facilities (Mustapha and Singh 2000). There is a perception that the services of medical practitioners in a private practice are more efficiently delivered than those offered at public health facilities which are characterized by the usual bureaucracy and inefficiency that accompany state enterprises (Rathwell and Phillips 1986). Hence one may be tempted to believe that the quality of service received is linked to patients' ability to pay.

### **Hypotheses**

The analysis of TTDHS is organized in order to empirically test hypotheses that are derived from theoretical perspectives of Coleman's social system and based on the literature review. Social system theory concerns the balance and dynamics of interests and control over scarce resources between groups contributing to constructing the social structure. Coleman's theory is informative because it gives people a way of viewing what has occurred over socioeconomic and political allocations between the two major ethnic groups in TT. Although his social system theory recognizes the interaction among an individual's purposive actions, social networks, and social capital, ethnicity or race is not considered as a pervasive criterion in a society. In the ethnic context in TT, ethnic identity can be considered as a major motive and value to seek the common social and

economic benefits through which we can locate the status of individuals and their groups in the social structure. The following hypotheses are based upon social system theory:

- H1:** Socioeconomic factors have the strongest and most persistent association with child mortality among all explanatory variables.
- H2:** Ethnic identity will show an association with child mortality, but after controlling for socioeconomic, demographic, and health care factors, ethnicity cannot maintain its influence on child mortality and its statistical significance.
- H3:** Individuals' economic levels affect children's and mother's quality of health; therefore, better health status and favorable maternity care reduce the risk of child mortality.

## CHAPTER 3 RESEARCH DESIGN AND METHODS

The previous two chapters presented the significance of the study of the relationships between child mortality and ethnicity in TT. Many researchers have found that there are economic, political, and educational inequalities in TT society. However not only are the discourses conflictive but frequently “perceptions” held by each ethnic group toward others cause conflictive claims about inequality in allocation over social resources. Race/ethnicity, socioeconomic factors, and prenatal/postnatal care including breastfeeding decision have been found to have a significant impact on child survivorship, but they do not independently affect child mortality. In addition, the effects of variables may vary depending on the other variables and on the social system of a given society.

The purpose of this chapter is to describe the TTDHS that is used in the next chapter to see if ethnic background plays a significant role in determining the probability of child mortality in TT society and to understand the level of influence of factors on child mortality to describe the characteristics of the social stratification system in this nation.

### **Data and Sample Size Analyses**

The TTDHS, a national-level sample survey, was conducted by the Family Planning Association of Trinidad and Tobago in 1987. The sampling frame for the TTDHS was based on the 1980 Population and Housing Census, one of the Continuous Sample Surveys of Population used by the Central Statistical Office of the Republic of

Table 3-1. Distribution of women 15 to 49 by ethnic and type of place of residence in 1987 and 1990, Trinidad and Tobago

Characteristics	1990 Census	1987 Census
Ethnicity		
African	39.6%	35.3%
East Indian	42.9%	47.0%
Mixed	15.4%	17.1%
Others	2.1%	0.7%
Type of Place of Residence		
Urban	48.7%	44.4%
Rural	51.3%	55.6%

Source: Population and Housing Census 1990, Central Statistical Office  
Demographic and Health Survey, Trinidad and Tobago, 1987 (Individual dataset).  
Sample population = 3,807

Trinidad and Tobago. The TTDHS is primarily concerned with family planning, maternal and child health and child survival. Information on household composition and housing quality is also included. Additionally, there are data about ethnicity, religion, and education, as well as economic indicators such as the presence or absence of consumer goods. The TTDHS has three separate sets of data based on household information, individual information, and child information. This study utilizes only one set, the TTDHS individual dataset that contains a total of 3,807 cases (individual women). The data is composed of women between the ages of 15 and 49. Table 3-1 shows the characteristics summary of the TTDHS along with corresponding figures from the 1990 Census. The original data is composed of 1,342 African women (35.3%), 1,787 East Indian women (47.0%), 649 Mixed women (17.1%), and 27 women (0.5%) claimed some other ethnicity. Comparing to the census figures, African women make up a smaller portion of the sample and East Indian women represent a larger portion of the sample. The report of TTDHS presented by Family Planning Association of Trinidad and Tobago

partly explains the reason for the difference in the ethnic composition; it could be due to an unintended over-sampling in areas where the East Indian population is heavily concentrated and a higher response rate among this group. Since the majority of East Indians have resided in the rural areas, a less urbanized sample than the actual Census population may be a reflection of those differences in ethnic distribution of the TTDHS from the actual Census numbers.

This study investigates three main questions: (1) Whether or not ethnic background influences child survivorship, (2) whether or not quality of life and education influence child survivorship, and (3) Whether or not child health care practices impacts on child survivorship. Of particular concern in this study is how the ethnicity influences the relationship between child mortality and its predictors. The data is first restricted to only women who belong to the two ethnic groups, African descent and East Indian descent. The second restriction includes only those women who had at least one child born. To assess the overall well-being of women in TT, it is pertinent to restrict the sample population to a narrow age gap as possible to avoid economic gaps over time; time lags between the time of childbirths and the time of survey, and faltering ethnic differences among the sample population. Hence the third restriction includes only women who had child(ren) within 10 years prior to the survey being conducted. The analysis of child mortality differences between the two major ethnic groups deals with various factors, such as demographic standings, quality of life created by variables of household composition and housing quality, and mothers' child health care. Lastly, women who did not answer any questions used in the analysis were excluded from the analysis. These procedures reduce the sample size to 1,082 from 3,807. Consequently, the sample

population used for the analysis in this study is composed of 584 East Indian women (54.3%) and 492 African women (45.7%). This represents 34.4% of all the respondents who belong to the two ethnic groups in the TTDHS.

### **Measures**

There are three clusters of predictors of child mortality: socioeconomic, demographic, and health related. The first cluster includes demographic factors such as ethnicity, place of residence, and marital status. The second cluster includes socioeconomic factors such as maternal educational attainment and quality of life. No data was collected in the TTDHS (it is common to all other DHS-I surveys) on household income per se, however, data intended to capture variations in household wealth and disposable income were collected and they are useful for creating an indicator of economic status which can be called “quality of life.” The third cluster includes health related factors such as prenatal care, type of place child born, quality of preventive health care, and breastfeeding. These variables are useful indicators of whether or not the respondent has access to a higher quality of health services and whether or not the respondent provides appropriate child health care to her children. Differences in health orientation and preference of medical facility, medical doctor, or medicine between the two major ethnic groups have been observed (Mahabir 1997, Mustapha and Singh 2000, Chijiwa 2001). Selections of the type of medical services serve as not only an indicator of the quality of health of women but also a proxy for their cultural and ethnic vestiges. Before proceeding to the descriptions of predictors mentioned above, the procedures of creating the respondent variable; child mortality, are presented for first then variable definitions and constructions are provided.



### **Child Mortality**

The analysis for this study includes women who had at least one child born within 10 years prior to the survey being conducted. Therefore, child mortality of a woman is determined in regards to her children who were born between 1978 and 1987. Information on the child survival status of each woman at the time of the survey is drawn from a variable “whether or not the child is alive” for computing child mortality in TT. Each woman was asked about all her children she had ever had from the youngest to the oldest. They were asked whether or not the youngest child is alive, whether or not the second youngest child is alive, whether or not the third youngest child is alive, and so forth. Additionally, women who had at least one child within ten years provided answers on whether or not their children were alive up to the 11th child.

In constructing the variable of “child mortality,” children who had died prior to the survey are coded as 1, and children who are alive when the survey was conducted are coded as 0, and then each woman’s answers of all her children are combined to create the variable; how many children the woman lost within last ten years. The analysis reveals that 1,008 women out of 1,082 have never lost a child, 65 women have lost one child, five women have lost two children, and four women declared having lost from three to six children. Since child mortality distribution is heavily right-censored, the multivariate analysis uses logistic regression techniques. The newly created variable of “child mortality,” which is the respondent variable in the logistic regression analysis, is dichotomized: 1 = women (74 women) who have lost at least one child and 0 = women (1,008 women) who have never experienced a loss of their child.

Table 3-2. Variable descriptions

Variable	Type	Value	Value Label	Proportion/Mean (Frequency)
Childhood Mortality	Categorical	0 1	Have never had a loss of child Have lost at least one child	93.2% (1,008) 6.8% (74)
Demographic Factors				
Ethnicity	Categorical	0 (reference) 1 (dummy)	East Indian African	54.5% (590) 45.5% (492)
Type of Place of Residence	Categorical	0 (reference) 1 (dummy)	Urban Rural	40.8% (441) 59.2% (641)
Marital Status	Categorical	0 (reference) 1 (dummy) 1 (dummy)	Married Separated / Divorced / Widowed Cohabiting / Visiting Relations	58.4% (632) 6.4% (69) 35.2% (381)
Socio-Economic Factors				
Years of Education	Discrete	0-16	-	7.70
Quality of Life	Scale	0.00-6.65	-	1.8656
Health Related Factors				
Quality of Preventive Health Care History	Scale	0-1.00	-	0.7316
Prenatal Care History	Categorical	0 (reference) 1 (dummy)	Adequate Prenatal Care Inadequate Prenatal Care	83.6% (905) 16.4% (177)
Privatized Health Care History	Categorical	0 (reference) 1 (dummy)	Privatized Health Care Only Public Hospital or Both	8.9% (96) 91.1% (986)
Breastfeeding History	Categorical	0 (reference) 1 (dummy)	Adequate Breastfeeding Inadequate Breastfeeding	80.7% (873) 19.3% (209)

Source: Demographic and Health Survey, Trinidad and Tobago, 1987 (Individual dataset)  
Sample Population = 1,082

## **Demographic Factors**

### **Ethnicity**

The original TTDHS contains four categories for ethnic background: African, Indian, Mixed, and Other as we already have seen in the previous section. For the purposes of this study, the ethnicity variable has been restricted to only women who belong to the two ethnic groups of East Indian and African with respective proportions of 54.5% (590) and 45.5% (492). In the multivariate analysis, East Indian coded as 0 (reference) and African coded as 1 (dummy). Proportions for each ethnic group before introducing the restrictions for determining the sample population in this study (excluding women who are mixed and other ethnicity) were 57.1%, East Indian, and 42.9%, African.

### **Type of place of residence**

The respondents were categorized into two types of residence: urban and rural. Within the sample population, woman who lived in urban areas at the time of the TTDHS survey are 441 (40.8%), and those who lived in rural areas are 641 (59.2 %). Women who lived in urban area are in the reference category coded 0, and those who lived in rural are in the dummy variable coded 1. The successive data from census in TT indicate that urban residents have been better educated than rural residents. These data also tell us the discrepancy in levels of educational achievement between urban areas and rural areas have gradually been narrowed reflecting the improvements in educational systems, which was on going when the TTDHS was conducted. In relations to the role of maternal education in child survivorship and the significant residential differences between East Indians and Africans, urban-rural distinction may influence in determining probability of child mortality in the society of Trinidad and Tobago.

**Marital status**

The TTDHS has five categories for classifying the participants' marital status. The actual questions concerning the respondent's marital status are stratified: "have you ever been married?" (yes or no), "are you married now?" (yes or no), "are you living with a common-law partner now?" (yes or no), "are you having a visiting relationship now?" (yes or not). The respondents' answers to four questions were accumulated and the participants were categorized into five categories: never married, married, living together, visiting relation, and widowed/divorced/separated.

Definitions of "living together" and "visiting relation" are vague. In the case of "living together," the participant may have a common-law relation with her partner, or the participant's partner might have another relationship outside their living place. In the case of "visiting relationship," the participant may marry the partner in the future, or she might be the second wife or partner. Since men who are in the prime of life tend to go abroad for a job, the population proportion of women to men is said to be 7 to 1 or more disproportional. These common-law type relationships instead of the legal marriage are commonly accepted and more generalized in TT. Therefore, marital status depends on their self-definition and it varies in how single women perceive their situation. These two categories exist in close relation to each other and it is difficult to distinguish between them clearly. Frequency distribution indicates that there is only one single woman in the sample population. To simplify the analysis the single woman is excluded from the analysis. Consequently, four categories of marital status were collapsed into three categories, married, cohabiting/visiting relationship, and widowed/divorced/separated with respective proportions of 58.4%, 35.2%, and 6.4%. Women who are married are

coded as 0 (reference), and other forms of marital status are dummy variables coded as 1 respectively in the multivariate analysis.

Previous investigation indicated that differences in the dominant form of marital union reflect significant cultural distinctions between the two ethnic groups. The considerably low marriage rate among African women compared to East Indian women reflects the predominance of other forms of unions, cohabiting relationship and visiting relationship, within African population. Even when we controlled for the variable of religion, ethnic identity has a very clear association with the dominant type of marital union (Harewood 1978, Chijiwa 2001). Therefore it is meaningful to investigate whether married women have lower child mortality; one of the two major ethnic groups, which has a lower probability of being married is subject to the additional disadvantages of higher incidence of child mortality.

### **Socioeconomic Factors**

#### **Maternal educational attainment**

The TTDHS asked questions in terms of respondents' educational attainment as to what level of education they ever attended (highest educational level) and, within that level (educational level for TT), how many years (education in single years). This study uses maternal education in a single year, which has a range between 0 and 16. The mean years of schooling is 7.70 for the sample population.

#### **Quality of life**

The information about household composition and housing quality was drawn from questions in the TTDHS to construct an index of quality of life. The index summarizes a household component such as consumer durables as well as access water and electricity; therefore, it serves as a proxy measure of level of modernization and level of hygiene

within household. Because, higher maintenance of sanitation may reduce a risk of infectious disease, thus reducing mortality (Wood and Carvalho 1988, Perz 1997), higher level of modernization indicates better quality of life, which may suggest income level. Quality of life is a broad concept that includes variables such as the quality of drinking water, toilet facilities, flooring materials, accessibility to electricity, and ownerships of such things as a VCR, television, automobile, and refrigerator. However, some of these variables may be more valid operational definitions of quality of life than others. To uncover the latent structure (dimension) of a set of variables, to select the factors that are considered adequate to explain the relationships among the observed variables, and to search for a plausibly appropriate value for each variable, the eight economic indicators were inspected using factor analysis.

Table 3-3 presents the results of the factor analysis. The eight variables were loaded on two factors that suggest a conclusion: Quality of life (at least as measured by the variables in this study) is not a unitary concept but rather, it is a concept that consists of two different underlying concepts. The numbers presented in the two columns of Table 3-3 represent the size of the correlation between the particular variable and the underlying factor. Hence, the correlation between the variable “toilet facility” and Factor 1 is .744. This correlation is higher compared to the factor loading for “drinking water” (.690). Because the factor loadings represent the degree of correlation between the variable and the underlying factor, the loadings can be used to weight each of the variables, and then they are combined into a composite index. The variables toilet facility, drinking water, floor material, VCR, and Car are highly correlated with factor 1. One might interpret this factor as the principal measure of quality of housing (in the sample population) and to

Table 3-3. Rotated component matrix for 8 variables of household composition

Variable	Loadings		Communality (extraction)
	Factor 1	Factor 2	
Toilet Facility	.744	.242	.611
Drinking Water	.690	.309	.572
Floor Material	.619	-.002	.384
VCR	.616	.168	.408
Car	.587	.115	.358
Refrigerator	.222	.838	.751
Electricity	.138	.825	.699
TV	.143	.778	.626
Variance (%)*	39.61	15.50	

Source: Demography and Health Survey, Trinidad and Tobago, 1987 (child dataset)

Note: Extraction Method: Principal Component Analysis

Rotation Method: Varimax with Kaiser Normalization

KMO and Bartlett's Test: sampling adequacy = .801

\* Rotation sums of squared loadings

construct a composite index for, namely, “luxury items.” Factor 2, which is highly correlated with refrigerator, electricity, and TV, is interpreted as a measure such as “consumer durables.”

In this study, however, the result of factor analysis is regarded as a means of determining which variables can be adequate for creating an index of “quality of life.”<sup>16</sup> Considering the moderate communality (the proportion of variance explained by factors) for each variable, I decided to leave all eight variables in the analysis. The weight in Factor 1 for each variable has a positive direction indicating better quality of household composition and housing quality; in addition, Factor 1 accounts for 39.61% of the

<sup>16</sup> First of all, factor analysis was conducted with 11 variables; in addition to 8 variables, ‘has stove,’ ‘has radio,’ ‘any family member has house/apartment,’ were included, and this analysis extracted three factors. Since these three variables negatively correlated with other variables in the analysis, they were excluded from the following analysis.

variability of the original eight variables, which has greater variability than Factor 2 (15.50% of the variability). Hence, the weights in Factor 1 for all eight variables are combined into one index “quality of life” instead of combining them into each index<sup>17</sup>. The new variable has a range between 0 and 6.65, an interval of 92. The mean score of quality of life for the sample population is 1.8656.

### **Health Related Factors**

Each woman provided health related information on prenatal care, type of place child born, use of immunizations, and breastfeeding about her children from the youngest to the 5th youngest (e.g., whether or not the respondent had prenatal care when she was pregnant the youngest child, whether or not had prenatal care when she was pregnant the second youngest child, and so on.) Hence, all respondents have five variables for each question. Each variable are dichotomized into 1 and 0. Since the number of children is different among mothers, five dichotomous variables of a certain question are combined and averaged out for creating a variable. For instance, in the case of prenatal care, if a woman had two children and had prenatal care when she was pregnant the youngest child (coded 1), but she did not receive prenatal care for her second youngest child (coded 0), and then her prenatal care history is 0.5. These newly created variables are considered as child health care histories of mothers.

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<sup>17</sup> I once constructed two variables for each factor; Factor 1 = luxury items and Factor 2 = consumer durables. However, the means test for luxury life by ethnicity indicated that East Indians are higher in quality of life on luxury items than Africans (sig=.031), and the means test for consumer durables by ethnicity showed that Africans are slightly higher than East Indians with no statistical significance. To simplify the analyses and to enhance the magnitude of ‘quality of life’ in addition to the reason which all variables have the same positive directions in Factor 1, I decided to combine all variables’ loadings for creating the index of Quality of Life.



### **Prenatal care**

The actual question for this variable was “when you were pregnant did you see anyone for a check on this pregnancy?” and answer categories were “no one,” “doctor,” “trained nurse,” “trained midwife,” “traditional birth attendant,” and “other.” The frequency distribution revealed no use of a trained midwife, traditional birth attendant, or other. I conferred with some doctors whom I met during my research in TT. They confirmed that generally there is no difference in medical care for pregnant women between being taken care of by doctors and by trained nurses in the case of normal pregnancy. However, in the case of unusual pregnancy or emergency, the probability of the incidence of miscarriage (Fetal deaths are not included in this study) and the risk of postnatal health and child health could be higher with no doctor in attendance. Hence three values for prenatal care are collapsed into two categories: received prenatal care from medical doctors (1) and did not receive prenatal care from medical doctors (0).

After combining the variables of five children, 134 women have never received prenatal care from doctors (12.4%), 905 women received prenatal care from only doctors whenever they were pregnant their children (83.6%), and 43 women have received prenatal care from doctors or trained nurses (4.0%). The newly constructed variable, which indicates “history of adequacy for prenatal care” is collapsed into two categories. Women who received prenatal care from only doctors are coded as 0 (reference), namely “adequate prenatal care,” and those who have received prenatal care from doctors but not always are combined and coded as 1 (dummy), namely “inadequate prenatal care.”

### **Type of place where the child is born**

The variable of the type of place where the respondents’ children were born is used to measure the respondents’ preference for privatized health care. The respondents were

asked, “in what type of place was your child born?” for which respondents’ answer fell into four categories: government hospital, private hospital, private home, and other. In TT, mothers are able to receive public medical services that are cheaper than medical facilities, including free child delivery at public hospitals. The ability of a woman to afford a private hospital or private doctor may be considerably influenced by her financial status. In addition to this purely economic sense, if there is a greater utilization of private medical facilities by certain ethnic group, and if the variable of privatized health care is statistically significant after controlling for other factors, then one can predict that there may be a cultural factor influencing the probability of child mortality through their own cultural preferences and tendencies. Hence, the variable for type of place child born is dichotomized into two categories; private doctor or facility (0=reference) versus public hospital (1=dummy).

In the same manner as the creation of the variable of prenatal care history, variables of “in what type of place was your child born” for all children (up to the fifth youngest) of a mother were combined and averaged out. Of the sample population of 1,082, 956 women use only public hospitals (88.4%), 96 women use only private doctor or facility (8.9%), and other 30 women use both (2.7%). Further, the variable is collapsed into two categories for the final analysis; one is “public hospital only or both” coded as 1 (dummy), and the other is “privatized health care only” coded as 0 (reference).

### **Quality of preventive health care for child**

Infants and children are extremely vulnerable to epidemic diseases and infectious illness, hence, inadequate child preventive health care directly risks child survival and a mother’s choices in health care practices influence the health and survival of the child. To assess mothers’ health practices related to child preventive health care, a new variable of

“quality of preventive health care history” was created using a number of questions about vaccination use for children in TTDHS. Children were assigned to either use or non-use category based on vaccination information from the child health cards, such as polio1, polio2, polio3, DPT1, DPT2, DPT3, yellow fever, measles, and if mothers have the child health and had tetanus. In the case mothers did not have the child health card, they were asked to recall whether or not the child had received a specific vaccination. The variable whether or not a health card for hospital care is possessed by mothers serves as a rough indicator of the accessibility for hospital care and the mother’s attention to her children’s health. UNICEF reported that for children without child health cards, the proportion of vaccinations given is smaller than for children with child health card (2003a). Overall, these questions intended to capture mothers’ care for their children and relations between actual child health and frequencies of receiving the health services including vaccination.

Questions on ten vaccinations and the child health card are asked mothers about her children from the youngest to the fifth youngest. All variables are dichotomous; yes (1) or no (0), which are combined into one index, quality of preventive health care history. The newly created variable has the range between 0 and 1. Of the sample population, 103 mothers had their all children receive all vaccinations and had child health cards of all their children (9.5%), 40 mothers had never had any of their children receive vaccination and had no child health card (3.7%), and the rest, 939 mothers were inconsistent to provide their children preventive health care (86.8%). The index of preventive health care history is used as scale variable, and the mean score is 0.7316 for the sample population.

Mahabir reported that East Indians tend to have eastern medical treatment or “folk/traditional” medical treatment (1997). Although education contributes to improved

awareness of importance in receiving vaccination appropriately, one may presume that a woman's skills in health care practices and health orientation are have been nurtured influenced by her family orientation and may be eventually rooted in their cultural and ethnic origin. Hence, the level of quality of preventive health care is considered as important measures for both influence of cultural orientation on child's health and accessibility to modern medicine.

### **Breastfeeding**

Breastfeeding have been found to be an important factor in infant survival, even after controlling for other variables that affect child mortality; infants who are bottled-fed from birth run a higher risk of health and development problems than do breast-fed children (McCann et al. 1981, Goldberg et al. 1984). Forste et al. (2001) reported that after controlling for socio-economic background and birth characteristics, race remained a strong predictor of breastfeeding. If differences in breastfeeding practices between African women and East Indian women would be observed in the sample, and if women, who did not breastfeed, have experienced more loss of their children than their counter part, then we can assume that one of the two major groups, which practice less adequate breastfeeding than the other racial group is subject to the additional disadvantage of higher child mortality.

The variable of months of breastfeeding is used for creating the variable, "breastfeeding history." It is a discrete variable including two special codings for inconsistent and never breastfeed. Similar to the three health related variables explained above, mothers provided answers how long they breastfeed their children from the youngest to the fifth youngest child, and never breastfeed is recoded as 0 and one or more months are recoded as 1. After combining the variables of five children and calculating

the average months of breastfeeding, 209 mothers have never breastfed (9.9%), 873 mothers breastfed all their children (80.7%), and 67 mothers are inconsistent in breastfeeding (9.4%). This variable, namely “breastfeeding history,” is dichotomized into two categories; mothers who breastfed all their children is coded as 0 (reference), namely “adequate breastfeeding,” and mothers who never breastfed or were inconsistent in breastfeeding is coded as 1 (dummy variable), namely “inadequate breastfeeding.”

### **Procedures of Data Analysis**

The first stage of the analysis is to use descriptive statistics stratified by ethnicity to summarize the basic characteristics of the sample. This step is meaningful for assessing the basic relationships between ethnicity and other factors such as demographic, socioeconomic, and health-related factors, and for simply assessing how well ethnicity can be a significant factor and predictor in the analysis of this study. The second step will be bivariate analyses to examine the relationships between all predictors in the later logistic regression analyses and the variable of child mortality. First, the proportion of women who have lost at least one child for all explanatory variables are presented, followed by odds of woman who experienced a child loss for all variables in order to check individual predictive power, and correlation coefficients between ethnicity and other predictors in order to demonstrate the influence of ethnic background on each factor.

The last stage in the analysis will consist of an examination of multivariate logistic regression models to determine whether or not influences of mothers’ ethnic background on child mortality can be observed after controlling for all other socioeconomic and health care factors. The Generalized Linear Model used will be the logistic regression model where the random component is  $B(X)$  the probability that a mother, who has at

least one child in the past 10 years, has lost a child, and  $X$  is the vector of explanatory variables, namely ethnicity =  $X_1$ , place of residence =  $X_2$ , unmarried (a dummy variable of marital status) =  $X_3$ , cohabitating/visiting relations (another dummy variable of marital status) =  $X_4$ , years of educational attainment =  $X_5$ , quality of life =  $X_6$ , quality of preventive health care history =  $X_7$ , inadequate prenatal care (dummy variable of adequacy of prenatal health care history) =  $X_8$ , public hospital use only (dummy variable for privatized health care history) =  $X_9$ , inadequate breastfeeding (dummy variable of breastfeeding history) =  $X_{10}$ . The full logistic regression model has the form;

$$\text{Logit}(\pi) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10}.$$

The first logistic regression model of the first phase will include only mother's ethnic background (Model 1). The second regression model introduces variables for demographic factors, place of residence and marital status, in the equation (Model 2), followed by the inclusion of socioeconomic factors, years of education and quality of life (Model 3). The next is the full model introducing the four health related indicators (Model 4). The multiple logistic regression analysis attempts to provide the combined effects of all variables on the likelihood of mother who have experienced a child loss, and to indicate the potential variables playing a significant role in determining the probability of child mortality in the society of TT. A series of nested logistic regression models systematically provide ethnic background variation for estimating direct or indirect effect on the child mortality through other factors determining child survival.

## CHAPTER 4 DATA ANALYSIS

### **Ethnic Differentials in Child Mortality and Its Determinants**

The previous research have found that race and ethnicity as well as urban-rural differences, marital status, education, income (in this study, quality of life), and health related variables are important predictors of child survival chance and child mortality. Since a major concern of this study is whether mothers' ethnic background matters to the incident of child mortality after controlling for other predictors, sample population distribution by all other variables are presented first. Descriptive examinations of the dependent and independent variables by ethnicity are presented in Table 4-1, which show how ethnicity connects with other factors predicting child mortality in this study. Reading across each row, we can compare the proportions of African and East Indian within each category of dichotomous independent variables and the means years of education, quality of life, and quality of preventive health care for African and East Indian.

#### **Demographic Characteristics**

Ethnic differences in child mortality presented in the first two rows of Table 4-1 indicate that approximately 7% of the mothers have experienced a loss of their child. The proportion of mothers with children born within 10 years who have lost at least one child is slightly higher among African mothers (8.3%) compared with East Indian mothers (5.6%). The differences between the two ethnic groups are moderately significant at 0.09 statistically.

Table 4-1. Characteristics of mothers with children born in last 10 years by ethnicity

	All Women	African	East Indian
[1] Childhood Mortality(*)			
Never Lost Child	93.2 %	91.7 %	94.4 %
Have Lost at Least One Child	6.8 %	8.3 %	5.6 %
[2] Type of Place of Residence**			
Urban	40.8 %	55.5 %	28.5 %
Rural	59.2 %	44.5 %	71.5 %
[3] Marital Status**			
Married	58.4 %	34.1 %	78.6 %
Separated / Divorced / Widowed	6.4 %	8.7 %	4.4 %
Cohabiting / Visiting Relations	35.2 %	57.1 %	16.9 %
[4] Years of Education (0~16)**			
Mean	7.70	8.00	7.45
(Standard deviation)	(2.300)	(2.124)	(2.410)
[5] Quality of Life (0~6.65)**			
Mean	1.866	1.762	1.952
(Standard deviation)	(1.151)	(1.182)	(1.119)
[6] Preventive Health Care History (0~1.00)(*)			
Mean	0.735	0.745	0.720
(Standard deviation)	(0.241)	(0.230)	(0.250)
[7] Prenatal Care History			
Adequate Prenatal Care	83.6 %	83.7 %	83.6 %
Inadequate Prenatal Care	16.4 %	16.3 %	16.4 %
[8] Privatized Health Care History**			
Privatized Health Care Only	8.9 %	4.9 %	12.2 %
Public Hospital or Both	91.1 %	95.1 %	87.8 %
[9] Breastfeeding History**			
Adequate Breastfeeding	80.7 %	85.6 %	76.6 %
Inadequate Breastfeeding	19.3 %	14.4 %	23.4 %

Source: Demographic and Health Survey, Trinidad and Tobago, 1987 (Individual dataset)

Sample Population = 1,082

Statistical significance for the association between ethnicity and variables: (\*)  $0.10 < P < 0.05$ , \*  $0.05 < P < 0.01$ , \*\*  $P < 0.01$



Ethnic differences in demographic background are noted in the next two panels, [2] type of place of residence and [3] marital status. Both variables are strongly associated with ethnic background as indicated by the statistical significances of  $p < 0.01$ . The TT population is historically considered to be divided into two groups; roughly, Africans inhabiting urban areas and East Indians inhabiting rural areas. The finding from the TTDHS represents this socially constructed residential difference. The majority of the East Indian division live in rural areas (71.5%) while a greater number of the African division live in urban area (55.5%). The distinct ethnic difference is also observed in the marital patterns. The marriage rate of East Indian mothers (78.6%) is more than double the marriage rate of African mothers (34.1%). The comparatively smaller marriage proportion among African mothers reflects the predominance of cohabiting/visiting relations within this population division; the proportion of African mothers who have cohabiting/visiting relations is substantially higher than the comparable figures for East Indian mothers with respective proportions of 57.1% and 16.9%. The conspicuous ethnic differences in marital status are found controlling for religious affiliations in the separate analysis [data not shown]. Although the influence of religion on the marital pattern are observed, there are still clear association with the dominant type of marital status – cohabiting or visiting relationship for African mothers, married for East Indian mothers. This shows that ethnic identity on marital status permeates religious influence and it could manifest a distinctive cultural notion for each ethnic group.

Urban-rural residence is regarded as a crude proxy measure for physical access to modern health services and thus, the potential for variation in the effect of education on child mortality risk across accessibility is expected. In considering this point and while

remembering that the majority of East Indians reside in rural areas, the East Indian division could be considered the higher risk group in child mortality in terms of accessibility to modern health facilities and maternal education.

### **Socioeconomic Characteristics**

The next two variables presented in Table 4-1 are maternal socioeconomic background, years of education and a measure of quality of life. The mean number of years of education among African women is 8.00 and East Indian women's educational attainment is lower than African women by 0.55 years. This difference is highly statistically significant with  $p$ -value less than 0.01. Referring to the growth ratio of educational attainment comparing younger generation (15-34) and older generation (35-48) in the separate analysis, younger East Indian women have increased their educational accomplishments by 31.8% and the comparable ratio among younger African women is 5.7% [data not shown]. The two numbers suggest that years of schooling had increased for both ethnic groups, and East Indian women had experienced much greater relative improvement. Consequently, the gap in the average years of education between the two major ethnic groups decreased from 1.79 years to 0.37 year, but still East Indian women were slightly disadvantaged in educational attainment as of the time the TTDHS was conducted. Quality of life is another indicator that enables us to observe mothers socioeconomic status of the mothers as an alternative of income in this study. The higher mean of quality of life observed for East Indians (1.952) compared with Africans (1.762). The difference is highly significant less than 0.01.

Contradictory arguments made by each ethnic group in TT over which ethnic group is economically advantageous may be nested in the contradictions of two important factors representing socioeconomic status; educational achievement and economic

advantage. It reflects a unique influence of ethnic backgrounds on probability of child mortality in TT. The probability of child mortality that a mother would lose at least one child also can be used as a measure to examine which of the two factors is a more plausible reality expressing well-being in TT.

### **Child Health Care Practices**

This study is also interested in whether or not mothers' ethnic background influence health care practices. If there is an association between ethnicity and health care factors, then interest is furthered as to what degree and how mothers' ethnic/cultural orientation involves their health care practices related to their children's survivorship. Preventive health care history measures mothers' practices on whether they have their children receive vaccinations against infectious diseases and illness based on the records of their children born within 10 years prior to the survey. The mean of preventive health care for African women is higher than for East Indian women with respective means of 0.745 and 0.720. The difference is statistically significant moderately at 0.093. The next indicator related to health care is prenatal care history whether or not women had adequate prenatal care history based on the records of their children born within 10 years. The proportions of women who had adequate prenatal care history for African mothers and East Indian mothers are almost same with respective proportions of 16.4% and 16.3% and there is no statistical significance.

Accessibility to appropriate and necessary medical care is another important dimension of a population's level of well-being. Mothers can receive public medical services in TT that are cheaper than private medical services, particularly, child delivery at public hospital is free. Therefore, one could assume that a person who can afford medical care at private hospitals should experience a higher quality of health care. But it

may not only be influenced by their socioeconomic level. For example, their selection as to whether to receive vaccination or western medicine, should be taken into consideration by paying careful attention to the cultural context peculiar to the society of TT.

The sample population is cross-classified by privatized health care only versus public hospital or both for each ethnic group (Table 4-1 [8]). Percentage for East Indian mothers who tend to practice privatized health care within ethnic group is 12.2%, which appears to be roughly 2.5 times larger than African mothers (4.9%). Referring to the growth ratio of proportion of privatized health care for younger generation (15-34) compared to older generation (35-40) in the separate analysis [data not shown], the proportions of women for privatized health care are lower among younger age; 3.8% for African and 9.7% for East Indian, compared to among older age; 6.7% for African and 16.7% for East Indian. The gap between the two ethnic groups slightly narrowed over time (-4.1 point); however, a greater use of private clinics among East Indian mothers is observed in both age groups. This situation implies that although delivery is free in public hospitals for all women in TT, East Indian women have tended to use private clinics.

Last two panels present breastfeeding selection indicating that about 19.3% of the mothers adequately breastfed their children. The percentage is considerably higher for African mothers (85.6%) compared with East Indian mothers (76.6%). The difference is highly statistically significant with  $p$ -value less than 0.01. African mothers are more likely to have breastfed adequately compared to East Indian mothers.

Based prior literature and examination of associations between ethnicity and maternal characteristics, East Indian mothers are more likely to have characteristics associated with higher incidence of child mortality – living in rural areas, lower

educational attainment, lower quality of preventive health care history, lower level of breastfeeding history – than are their African counterparts. However, observed in this study, African mothers seem also disadvantageous in terms of marital status, quality of life, and privatized health care history. Not only can we not satisfactorily determine which of the factors is most influential on child mortality but also, whether privatized health care is mainly influenced by purely economic condition or whether it is more likely a matter of cultural preference. From the findings, the socioeconomic section however, we observed an unusual inversion of the standard relationship between two indicators of human capital; educational and economic achievement. Both have been considered important determinants of child survivorship. This unusual situation may facilitate TT society to conceive an unfeasible sphere in which factors interact uniquely. For furthering our understanding of nature of explanatory variables on child mortality in TT, the individual effects of these variables on child mortality are examined next.

#### **Influence of Maternal Characteristics on Child Mortality**

The first column in Table 4-2 shows the proportions of mothers who have lost at least one child within 10 years prior to the TTDHS, and mean years of education, quality of life, and preventive health care for those mothers. The second column reports the odds ratio of mothers who have experienced a child loss for each of the factors. The third column presents the correlation coefficients indicating the associations and their directions between ethnicity and all independent variables.

#### **Influence of Demographic and Socioeconomic Factors**

The proportions of mothers who have experienced a child loss within categories of each of the demographic variables appear in panels [1], [2], and [3] in the first column of Table 4-2. The percentage is higher for rural areas (7.0%) compared with urban areas

(6.6%). More women who have cohabiting or visiting relationships have experienced a child loss (7.9%) than separated/divorced/widowed women (4.3%) and married women (6.5%). These results are somewhat unexpected and contradictory to previous research, since the support of the children's father is important for child survival and health economically, practically, and emotionally, the category of married women is normally expected to be the lowest disadvantaged group in child mortality. In addition, the group of separated/divorced/widowed women who are normally considered insufficient in maternity assistance has a relatively small proportion of mothers experiencing child loss. However, mothers in the category of separated/divorced/widowed mothers do not seem to associate with higher child mortality. This may be caused by the considerably smaller number of separated/divorced/widowed mothers; 69 cases, 3.1% of the sample population.

The individual effect of each demographic factor on child mortality is reported in the second column of Table 4-2. With the exception of ethnicity, each of demographic factors does not significantly influence the likelihood of being women with a child loss. Ethnicity correlates with urban-rural differences and marital standings as shown in the third column.<sup>18</sup>

Education level is an important achieved human capital variable because it covariates with economic life chances, and therefore with child health and survivorship. The mean years of education for mothers with an experience of child loss is slightly shorter (7.59years) compared with their counterparts (the mean for all alive =7.70 years),

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<sup>18</sup> The variable of marital status is dichotomous in the examination of correlation with ethnic identity. Married is 0 and other two categories, separated/divorced/widowed and cohabiting/visiting relationship, are collapsed into one category as 1.

Table 4-2. Proportions and odds for mothers who have lost at least one child and correlations between ethnicity and maternal characteristics

Characteristic	% of Mothers who Have Lost Child(ren)	Bivariate (Odds)	Correlation with Ethnicity
[1] Ethnicity			-
East Indian (0)	5.6 % (*)		
African (1)	8.3 %	1.53 (*)	
[2] Type of Place of Residence			-0.274 **
Urban (0)	6.6 %		
Rural (1)	7.0 %	1.07	
[3] Marital Status			0.120 **
Married (0)	6.5 %		
Separated / Divorced / Widowed (1)	4.3 %	0.66	
Cohabiting / Visiting Relations (1)	7.9 %	1.23	
[4] Years of Education (0~16)		0.99	0.450 **
Mean	7.59		
(Mean for All Alive)	(7.70)		
[5] Quality of Life (0~6.65)		0.79 *	-0.083 **
Mean	1.580 *		
(Mean for All Alive)	(1.887)		
[6] Preventive Health Care History (0~1.00)		0.35 **	0.051 (*)
Mean	0.664**		
(Mean for All Alive)	(0.737)		
[7] Prenatal Care History			0.049 (*)
Adequate Prenatal Care (0)	6.2 % *		
Inadequate Prenatal Care (1)	10.2 %	2.99 (*)	
[8] Privatized Health Care History			0.128 **
Privatized Health Care Only (0)	2.1 % *		
Public Hospital or Both (1)	7.3 %	3.70 (*)	
[9] Breastfeeding History			-0.113 **
Adequate Breastfeeding (0)	4.2 % **		
Inadequate Breastfeeding (1)	17.7 %	4.86 **	

Source: Demographic and Health Survey, Trinidad and Tobago, 1987 (Individual dataset)  
Sample Population = 1,082

Statistical significance: (\*)  $0.10 < P < 0.05$ , \*  $0.05 < P < 0.01$ , \*\*  $P < 0.01$

but the two groups are not statistically independent. The odds of mothers with a child loss indicates that the higher the educational attainment, the lower the odds of being a mother who has a child loss. But the difference is too small and there is also no statistical evidence.

Another measure of socioeconomic status, mean score of quality of life, indicates that level of quality of life for mothers with a child loss is also lower (1.580) than those with no child loss (1.887). A *t*-test for independence showed that the mean score of quality of life for mothers with a child loss and those with no child loss differs significantly with *p*-value less than 0.01. The odds of having experienced a loss of child for quality of life is 0.79 (b-coefficient = -.239) means that the higher the level of quality of life, the lower the likelihood of child mortality. Moreover, the quality of life influences the likelihood of child loss significantly at the *p*-value of 0.028. These results support the previous studies that quality of life, which is considered a factor having an abstract concept substituting for income and housing quality in this study and having a significant association with child mortality.

As we observed in the previous section, there is an unusual inversion in educational attainment and level of quality of life between the African division and the East Indian division. The unexpected non-significant influence of education on child mortality may be a reflection of this unique relationship. In terms of likelihood of child mortality, we may expect that the influence of quality of life is stronger than that of education.

### **Health-related Proximate Factors**

Lastly, this study is interested in the important inquiry involving possible modification in the child mortality pattern by the particular role of health-related



orientation. The level of accessibility to modern health services is expected to narrow the differences in the higher and the lower child mortality group.

The mean score of quality of preventive health care for women who have experienced a child loss (0.664) is lower compared with that for women who have no experience of child loss (0.737) that is exhibited in the panel [6] in the first column of Table 4-2. A *t*-test for independence demonstrates that differences between the mean preventive health care score between the two groups are statistically significant less than 0.01.

Inadequate prenatal care represents that poorer prenatal care associates with higher probability of child mortality. The group of mothers who are inadequate for prenatal care has a larger proportion of mothers with a child loss (10.2%) compared to their counterparts (6.2%). This association is moderately significant at 0.071. The odds of having a child loss for mothers having received inadequate prenatal care is 2.99 times greater than that for mothers having received adequate prenatal care, and is moderate statistically significant at 0.09. The public hospital category composes 7.3% of mothers with a child loss, and the odds of using public hospital only for mothers with a loss of child is 3.70 times larger than that of their counterpart with a moderate statistical significance at 0.071. Breastfeeding history, which showed a strong association with ethnic identity in the previous section, also presented a significant association on the likelihood of child mortality. The proportion of mothers with a child loss within the group of inadequate breastfeeding is 17.7% that is larger than that of adequate breastfeeding (4.2%). As clearly shown in the second column, inadequate breastfeeding is 4.86 times higher probability of child mortality than adequate breastfeeding. The association is

highly statistically significant less than 0.01. Hence, mothers in higher quality of preventive health care, adequate prenatal care, privatized health care, and adequate breastfeeding appear to have characteristics of lower child mortality. These results indicate that generally favorable treatments for the pregnancy and delivery correspond with a greater chance of child survival.

While ethnicity, quality of life, and health related factors demonstrate significant influences on child mortality, type of place of residence, marital status, and years of education seem to have no influence on child mortality. A review of previous studies provides substantial evidence of causal connections in the level of strength among child survival and geographical settings concerning access to basic health resources, services and maternal education. Particularly, education has been stressed in playing a pivotal role in decreasing child mortality. However, overall, the level of educational attainment itself could not explain it conclusively. Instead, specific knowledge and awareness of appropriate maternity and child health care, rather than formal education, may be more proximate factors of child survival. The degree of strength in causal connections would also depend on the geographical location of the nation and the extent of the public transportation system within the nation. Living on small and relatively wealthy islands in the Caribbean, TT society has been able to develop an extensive cheap private transportation system. If people have fairly equal access to the modern health services, the differences between African and East Indian in use of preventive health care, prenatal care, privatized health care, and decision to breastfeed can be considered a purely ethnic conventional preference influenced by their community and their culture.

### **Multivariate Logistic Regression Models**

I presented bivariate analyses for understanding the individual relationship between child mortality and each of independent variables in multivariate analyses. Some findings in terms of rural-urban differences, marital status, and educational attainment did not support previous research. Simultaneously, there are paradoxes when the associations between ethnic background and other mothers' characteristics were employed. To examine the net of these various factors' influence on the probability of child mortality, the relationships between child mortality and indicators by means of the multivariate logistic regression analysis, which allows us to obtain more definite comparisons between the two ethnic groups in terms of child mortality is explored next.

#### **Ethnic Influence on Child Mortality**

Table 4-3 presents five nested logistic regression analyses. Model 1 includes only ethnicity. The coefficient for ethnicity is .428. By taking the antilog of the coefficient of ethnicity, the probability that African mothers have lost at least one child is 1.534 times more than East Indian mothers. Demographic factors and socioeconomic factors are introduced into Model 2 and Model 3 respectively. The coefficients for ethnicity in the two models indicate that the East Indian division consistently has a lower probability of having experienced a child loss than the African division after controlling for demographic factors in Model 2, and after controlling for socioeconomic factors in Model 3. Model 4 includes all explanatory variables. The odds ratio of Africans increases to 2.177.

The non-significant factors are removed from the model to produce the best fit with the fewest variables, and this final model is presented in the last column. Differences between the chi-squares reported for Model 4 and Model 5 are not significant ( $\chi^2=2.727$

with  $df=3$ ,  $p>0.250$ ) indicating that the simple model fits the data as well as the full model. Not only can ethnicity be considered as a powerful indicator of the probability of child mortality in this society indicated as  $p$ -value = 0.014, but also its  $\text{Exp}(b)$  for Africans keep its value as 2.026 accounting the probability having experienced a child loss in this model.

The crucial question for this study – if ethnic background persists in child mortality controlling for socioeconomic, demographic, and health-related factors in the TTDHS – is answered; ethnic background is statistically significant. The East Indian division appears to have a lower probability in child mortality than the African division after controlling for maternal characteristics. As variables are included in order, the differences between the two divisions seem to widen and strengthen.

### **Urban-Rural Setting, Marital Status, and Scio-economic Influences**

Demographic factors, place of residence and marital status are introduced in Model 2. After controlling for ethnicity and marital status, mothers living in rural areas are 21.1% more likely to have experienced a child loss compared with their counterparts. After controlling for ethnicity and place of residence, separated/divorced/widowed mothers are 76.3% ( $e^{.567} = 1.763$ ) more likely and mothers who have cohabiting/visiting relationships are 0.1% more likely having had a child loss compared with married women. But the influence of disadvantage for rural settings and forms of union (married and separated/divorced/widowed) in child mortality is no statistically significant.

Model 3 introduces socioeconomic variables of years of education and quality of life. Mothers who have a higher educational attainment are less likely to have experienced a child loss, but this is not statistically significant. Instead, the second socioeconomic variable, quality of life statistically significant, therefore, mothers who have a

Table 4-3. Probability of having lost at least one child controlling for demographic, socioeconomic, and health care factors  
(Logistic Regression)

Variables/Values	Model 1		Model 2		Model 3		Model 4		Model 5	
	b coef.	Exp(b)	b coef.	Exp(b)	b coef.	Exp(b)	b coef.	Exp(b)	b coef.	Exp(b)
Constant	-2.612 **		-2.89 **		-2.393 **		-1.521 *		-1.079 *	
Ethnicity										
East Indian (ref.)										
African	.428 (*)	1.534	.499 (*)	1.647	.484 (*)	1.623	.778 (*)	2.177	.709 *	2.026
Place of Residence										
Urban (ref.)										
Rural			.191	1.211	.078	1.082	.230	1.259		
Marital Status										
Married (ref.)										
Separated / Divorced / Widowed			-.567	.567	-.692	.501	-1.357 (*)	.257	-1.367 (*)	.255
Cohabiting / Visiting Relations			.001	1.001	-.115	.891	-.140	.869	-.106	.899
Years of Education					-.029	.733	-.016	.984		
Quality of Life					-.232 *	.793	-.217 (*)	.805	-.266 *	.766
Preventive Health Care History							-.983 *	.374	-.977 *	.377
Prenatal Care History										
Adequate Prenatal Care (ref.)										
Inadequate Prenatal Care							1.477 *	4.378	1.491 *	4.444
Privatized Health Care History										
Privatized Health Care Only (ref.)										
Public Hospital or Both							.922	2.514		
Breastfeeding History										
Adequate Breastfeeding (ref.)										
Inadequate Breastfeeding							1.718 **	5.574	1.713 **	5.548
-2Log likelihood	536.684		535.019		530.654		476.683		479.410	
$\chi^2$ (df)	3.146 (1)		4.810 (4)		9.176 (6)		63.147 (10)		60.420 (7)	
Model <i>p</i> -value	.076		.307		.164		<.001		<.001	

Source: Demographic and Health Survey, Trinidad and Tobago, 1987 (Individual dataset)

Sample Population = 1,082

Statistical significance: (\*) 0.10 < *P* < 0.05, \* 0.05 < *P* < 0.01, \*\* *P* < 0.01

lower level of quality of life potentially have a higher risk of child loss. After controlling for ethnicity, place of residence, marital status, years of education, when quality of life decreases by one point, the probability to have lost a child is multiplied by 1.26 ( $e^{0.232}$ ). Model 3 is not significantly stronger than Model 2 (4.366 with  $df=2$ ,  $0.25 > p > 0.1$ ). However, quality of life seems to be a valuable determinant for child mortality directly/indirectly, combining the findings in the bivariate analysis and the multivariate analysis. Since the level of quality of life appears to be higher for the East Indian division, both ethnic background and economic situation work towards East Indian mothers preferably.

### **Influence of Health-related Factors on Child Mortality**

Model 4 assesses the effect of ethnic background on child mortality by adding health-related factors. In this model all factors are included. Two findings stand out in the model. Ethnicity achieves its statistical significance at 0.01, and odds ratio for African mothers increases from 1.623 in Model 3 to 2.177 in Model 4. This implies that the effect of ethnic differences with socio-demographic factors only and the combined effect including health-related factors account for approximately 55% of the child mortality difference between Africans and East Indians.

The inclusion of four health related factors adds a significant strength in the inclusive model. Differences between the chi-squares reported for Model 3 and Model 4 are highly significant ( $\chi^2=51.147$  with  $df=4$ ,  $p<0.001$ ). Effects of the health-related indicators on the probability of having a child loss follow the findings in the bivariate analysis. The odds for dummy variables for prenatal care and privatized health care show that mothers who have received adequate prenatal care, who have practiced privatized health care, and who have breastfed adequately are less likely to have experienced a loss

of their child with respective odds of 4.378, 2.514, and 5.574. Prenatal care and breastfeeding are statistically significant less than 0.05 but privatized health care has no statistical significance. The probability having experienced a loss of child decreases with a increase of quality of preventive health care score; for women who have a higher score of quality of preventive health care are less likely to have had a child loss; when preventive health care increases one point, child mortality decreases by 2.67 ( $e^{.983}$ ). This is statistically significant less than 0.01.

With the exception of years of education, the inclusion of health-related factors increases the effects of ethnicity, urban-rural settings, marital status, and quality of life, indicate that they are not working through health-related factors. On the other hand, educational difference is weakened by the inclusion of health-related factors suggesting that education potentially works through health-related factors to influence child mortality. Notably, ethnic background continues to have an independent effect on child mortality. To examine the effect of ethnicity further, the interaction terms between ethnicity and the variables in the simplified model (Model 5) was conducted separately, however, none of the interaction terms were significant suggesting that the factors influencing the probability of child mortality in reported in Model 5 do not vary by ethnic background.

## CHAPTER 5 CONCLUSION

The purpose of this thesis has been to explore the economic and cultural differences between African women and East Indian women in TT by means of examining ethnic differentials in child mortality. There are a variety of factors relating to child mortality and to each other as well. All the factors are considered to be affected by mothers' socio-economic standings hence, the issue of child mortality has an aspect of being socially determined similar to the context of ethnic issues.

Discourse concerning inequality in socio-economic standings is split along ethnic lines in TT. Differences in the historical experiences of each population of Africans and East Indians and the development of ethnic identity through discriminatory relationships between old-timers and new-comers are found in the contemporary representation of political identity, socio-economic position, and residential isolation. As such, an unusual association between educational achievement and economic advantage is considered due to the unique distribution of political power and economic power sharing between the African division and the East Indian division. The juxtaposition of strikingly different ethnic group identities has resulted in a construction of crossing perceptions about the inequalities in general socio-economic standings toward others.

### **Ethnicity in the Analysis of Child Mortality**

In order to explore ethnic inequalities in the health context, as a vital human capital, this thesis made use of the variable of child mortality constructed from the TTDHS data. Quantitative analysis in this study included three clusters of child mortality factors:



demographic, socio-economic, and health-related factors. The findings are summarized as follows. First, Africans and East Indians were distributed quite differently in terms of residential and marital patterns. The ethnic difference in place of residence followed the historical evidence that the majority of African women reside in urban areas while the majority of East Indian women appeared to be rural residents. Also African women markedly differ from East Indians in terms of marital status. African women are more likely to have cohabiting or visiting relationships, while most East Indian women secure matrimonial relationships. The proportion of women who are married in the East Indian division is as twice as much as that of the African division.

Second, an important contrast emerged in the socio-economic variables. The findings demonstrate manifest relationships between the level of educational attainment and the economic standings peculiar to the historical context of the TT society. African women had a higher level of educational attainment however, they had a lower score on quality of life compared to East Indian women. The differing livelihoods secured by the women in the African division compared to East Indian division women reflected the historical background held by each ethnic group.

Third, in the cluster of health service use, strong differences were also found in terms of privatized health care history and breastfeeding history. East Indian women tended to use privatized health care compared to African women of whom less than 5% women use only private facility for delivery. In breastfeeding selection, African women are more likely to have breastfed compared to East Indian women. They also differed in preventive health care use. Proportionally, African women are more likely to have their children vaccinated compared to East Indian women, however, the difference is not so

striking. Lastly, there was no evidence that these women are different in terms of prenatal care use. This result corresponds to the high attainment of prenatal care in TT. Unfortunately, there is no previous record to provide the information about the ethnic differences between Africans and East Indians,

The results illustrated the heterogeneity between Africans and East Indians. Though the findings did not always indicate specific ethnic group advantages to maternal and child health, ethnic differences in residential and marital union patterns manifest that ethnic identity is historically and culturally constructed in the livelihood of Trinibagonian mothers. The unusual situation in which the wealthier East Indians are less educated compared the economically disadvantaged Africans may contribute to level off the socio-economic distinction between the two ethnic groups. At the same time, it may also cause an unclear relationship between health care factors and ethnic background.

The second section of analysis presented the independent effect of each variable. How each of the mothers' characteristics proportionally differentiates the child mortality is summarized as follows. First, the association between ethnic background and child mortality was observed. Africans have the larger proportion of mothers having experienced a child loss compared to East Indians. Second, the variations in demographic factors influence the slight difference in child mortality. But the associations are not always in the expected direction. Rural settings disfavor mothers in child mortality, which supports previous research. Though the maternal union patterns did not follow the common consensus of researchers, the married status did not seem to be the favored marital status, instead, the groups of mothers who have been separated, divorced, or widowed appear to compose the smallest proportion of which mothers have experienced

a child loss. Third, years of school also did not appear to be a significant variable in determining child mortality, which is dissimilar to the previous findings in child mortality studies. On the other hand, the quality of life indicator showed its strength in influencing the child mortality. In TT, urban-rural distinction, marital status, and level of educational achievement do not seem to differentiate the child mortality.

Fourth, health related factors indicated that higher standards of maternal and child health care show potential for reducing child mortality. The presence or absence of use in preventive health care, prenatal health care, and breastfeeding, as well as the delivery at private facility evidently yield the disparity in child mortality. An examination of the independent effect of each variable on child mortality showed that mothers who are of East Indian descent have higher scores of quality of life and have had a child exclusively at a private facility, both of which indicate affordability to access a better quality of health care. On the other hand, African women have characteristics of women who have no child loss in terms of better preventive health care history and adequate breastfed.

In sum, referring prior research on determinants of child mortality, African women are more likely to have a lower risk of child mortality in terms of urban settings, higher education, higher score of preventive health care history, adequate prenatal care, and breastfeeding history, while East Indian women have been shown to have a lower risk of child loss in terms of married status, higher score of quality of life, and privatized health care history. The economically advantaged ethnic group, East Indian, is found to be lower usage of appropriate health care.

The final analysis presents logistic regression models that elaborate the findings in the previous two analysis sections. The findings continuously showed that East Indian

women had experienced lower levels of child mortality than African women after controlling for demographic, socio-economic, and health related factors. There is strong evidence that ethnic background differentiates the child mortality as the ultimate outcome of Trinibagonian mothers' livelihood. Quality of life played a significant role throughout all models. The roles of health-related factors, with the exception of privatized health care history, were strongly significant. Specifically, breastfeeding and prenatal care use are very important factors to reduce the risk of child death. In the meantime, ethnic background conspicuously appeared to be a unique and significant factor related to child mortality. The findings indicate that ethnic identity pervades each of the variables. Characteristics of each of the factors relating to ethnic identity accumulated as clusters were added to the equation. This finding supports the previous research regarding the steadfast causal pathway of household socio-economic standings impacting child survival chances. On the other hand, ethnic background somehow plays a significant role to determine child survival chances. Interestingly, here ethnicity seems to behaving somewhat independently; although analyses do control for all other factors.

The effect of ethnic background on child mortality gains its strength every time that the equation includes other variables with the exception of Model 3 in which socio-economic factors were included. Comparing Model 2 and Model 3, the effect of ethnic background on child mortality was slightly reduced from b-coefficient of 0.499 to that of 0.488, or reduced the association between ethnic background and child mortality by 3.7% (the odd ratio increased from 1.647 to 1.623). This result implies that the socio-economic factors contribute to reducing the risk of child mortality; i.e., the ethnic difference in child mortality is dependent upon the distribution of socio-economic factors. However,

recalling the association between quality of life and ethnicity, the economic factor also works towards the East Indian sub-division. Thus, although socio-economic factors seem to compensate the ethnic gap in child mortality, the African mothers' situation is even worse if they do not have an additional benefit of advantageous socio-economic factors.

The evidence of Africans' disadvantage in child mortality is further clarified in the comparison between Model 3 and Model 4. Inclusion of the effects of health care factors increased the association between ethnicity and child mortality by 88.9% (the odd ratio increased from 1.623 to 2.177). Thus, the ethnic difference in child mortality is less likely dependent upon the distribution of health care factors. While in the comparisons of health care factors between the two ethnic groups, Africans seem more advantaged in reducing the risk of child loss in terms of preventive health care and breastfeeding, which both appear to be significantly important determinants of child mortality in TT, the coefficient of the dummy variable for ethnicity increased from 0.484 (Model 3) to 0.778 (Model 4). This indicates that if an African woman does not have an additional benefit of health care, the risk of child loss is even worse.

These empirical evidence from the TTDHS demonstrates that the level of educational attainment may not be measures for lowering the risk of child loss in TT, but economic status can be an important factor in reducing child mortality among African mothers. For mitigating the effect of economic inequality in child mortality, health care services in terms of providing further universal preventive health care services and further diffusion of knowledge of breastfeeding as well as distribution of accessibility to maternal care can substitute for the effects of economic disadvantage on child mortality.

### **Locating Ethnic Context in Trinidad and Tobago**

In sum, the analysis implies an important reality in this nation that the ethnic identity exists in the context of child mortality in TT, while quality of life and three health care factors have significant powers in predicting the probability of child loss. In line with the posited hypotheses, I would like to begin with the second hypothesis, which was posited paradoxically in explaining ethnic context in TT society. Within the framework of social system theory: after introducing all variables in the equation, ethnic identity does not have a predictive power – ethnic identity can be a means for forming groups to pursue common goal, but consequently, this collective identity can be absorbed into a social system. From the analysis of the TTDHS, however, distinct ethnic differences were observed in the aggregate and continue when the examinations were carried out. This implies that ethnicity has a direct and an indirect effect on child survival. Notably, the variables such as place of residence, education, privatized health care, and marital status, which are correlated with ethnic identity, are not significant in predicting child mortality. Ethnicity uniquely incorporates the roles of these variables' features. Ethnic values within each factor may be compatible with some factors while the ethnic values can be bargained with other factors.

This account coincides with the concept of the indirect influence of race or ethnicity on child survival; Hummer noted that, “while some socio-demographic and proximate factors work uniformly across racial groups to affect infant mortality, others may operate uniquely within groups to promote or reduce the chances of survival” (1993: 534). In his study, child mortality of African American women is approximately twice as high as that of Anglos for both exogenous and endogenous causes of death, which are nearly identical for the finding in this study. However, after controlling for demographic,

socio-economic, health care factors, the effect of race on child mortality decreases every time the analysis includes factors; furthermore, racial influence is eliminated after controlling for child health (gestation and birth weight). We need further research exploring and including such factors as child health in comparisons between the ethnic groups in child mortality for capturing present misspecifications; however, in the analysis of the TTDHS, the ethnic child mortality differential cannot be attributable to health care factors in TT, although they do universally contribute to reducing the risk of child loss. Thus, we may conclude that in the TT society, ethnicity uniquely determines child survivorship, and there is a strong influence of ethnic identity functioning and organizing the social system where the social inequality results from differences in interests and control over scarce resources, and power depends on the relationship of the two groups.

For the first hypothesis, I posited that socio-economic status is the most significant variable to predict the probability of child mortality. Indeed, quality of life remained significant after all other variables were included; however, it did not seem to be appropriate to say that socio-economic status is the strongest determinant for child mortality in TT society. In the meantime, the education effect was unexpectedly insignificant. Generally, a low level of education significantly elevates the risk of child mortality, but the relationship between formal education and child mortality has been ambiguous in previous studies. The findings support education's role, which is considered to assist women to overcome disadvantages of physical accessibility, i.e., proximity in terms of distance and travel time. On relatively small islands, people can have moderately equal access to modern health services. It is inferred from these results

that urban-rural distinctions do not have the power to predict the probability of child mortality.

However, we cannot assume that education as well as residential differences as indices of proximity may not matter in TT society. Although the African sub-population is generally considered to have characteristics of the lower child mortality group in terms of education and accessibility, it appeared to be the higher risk division in child mortality. Often, child mortality indicates that the education advantage in child survival is more pronounced in urban areas because of the more complicated social activities and the less reliance on familial mechanisms (Bicego and Boerma 1996). On the other hand, women in rural areas are still under various constraints, such as maintenance of traditional practices and beliefs. In these respects, it can be beneficial to investigate pregnancy outcomes within each community so that we may have more tangible understandings about the relations between education and child mortality. Caldwell indicates that maternal education's role is to change traditional patterns of family influences so that women may improve their understanding of the importance of using modern medical services and may overcome their skeptical perception of modern technology (Caldwell 1979, Caldwell et al. 1983).

At the same time, investigation of the women's situation in the community of their ethnic counterpart may be informative in terms of comparisons between formal education and maternal education. Implicitly, privatized health care was used in this study as an indicator of socio-economic status as well as an indicator of cultural differences. It was expected to appear as a significant variable to strengthen the differences in child mortality between the two groups. However, probably because of correlation with



ethnicity, it appeared to be offset one-sidedly. Nevertheless, privatized health care orientation is an important dimension considering the differences between Africans and East Indians in the TT society. In research examining the perceptions of the Health Centres, ethnic differences are manifest. Africans are more likely to be dissatisfied with doctor's services while East Indians seem to be dissatisfied with nursing services, pharmacy services, and the management of the health centres. Mustapha and Singh (2000) conclude that the health centre users' perceptions are probably biased in favor of members of their own ethnic group because the majority of doctors are of East Indian descent and the majority of other health services personnel, particularly nurses, are of African descent. Mahabir (1997) also reports that many women in the relatively traditional division, East Indian, relocate to urban areas to be among fellow East Indians, which makes it practical for them to congregate and share common cultural activities. Creolization may occur through modernization which can be seen by East Indian as pressures by the overwhelming Afro-Creole notion to modify East Indians' behavior or to conform to a creolized society and culture. Thus, medical services provided by the public sector should seek a "culture-sensitive" health care scheme while, avoiding falling into the situation where the officially sanctioned medical system is based only on western science and technology.

The beneficial impacts of the three health care factors were found as posited in the third hypothesis. No interaction between ethnicity and the three health care factors is significant, implying that each health care factor works independently from ethnic identity and thus, better health care associates with decrease of child mortality universally for all women in TT. Therefore, this result corresponds to the implication of previous

research, that general efforts to lower infant mortality, including provision of more adequate perinatal care and preventive health care, may have the preferable impact for all groups (Hummer 1999). Recalling the increase of ethnic influence when health care factors are included, there should be unmeasured and latent factors in the context of the multi-cultural society beyond these strong health care factors in determining child mortality. This account can provide an answer to the question; does ethnicity matter in child mortality in TT? However, the answer itself conceives another question; why does ethnicity matter? What does ethnicity mean in this society? Unfortunately, we could not examine this question with the TTDHS.

The event of child loss may be only a tip of the pile of accumulated thousands of causalities. We may, therefore, first wish to distinguish child deaths in age at death and in cause of death (as well as causes designed as endogenous and exogenous), and second wish to include “misspecified” factors in the framework of child survivorship in terms of; selectivity such that if the child loss occurred spontaneously, or because of abortion, miscarriage, or pregnancy complication, or because of fertility orientation. Maternal health and child health are also expected to be predictive measures such that if the baby is provided adequate nutrition, if habitus influences birth outcomes, and if the stressful circumstances affect the maternal conditions as well as physical information such as birth weight and genetic factors such as endogenous factors. Perception toward medical care, such as preference and choice of consumption goods, including childcare services, different resource of treatments, is expected to explain ethnic differences in health orientation. Specifically, we may argue that there is interaction between factors relating to individual behavior and orientation derived from their ethnic/cultural notion and socio-

economic status. Both may be highly controversial topics because each is socially constructed -- health status and birth outcome are affected by the terms of ethnicity and socio-economic factors. Hence, there is no easy way to measure ethnicity and socio-economic status.

Longitudinal research is requisite and investigations into the components and mechanisms of socio-economic status as they relate to health outcomes are crucial. Studying the interrelations between material capital, human capital, and social capital may bring out the mechanisms of the social determinants of health (Oakes and Rossi 2003). This way of studying may further shape our understanding of the ethnically stratified society's system, while we continue to refine our measures and collect data to satisfy the model of child survivorship. We can attach importance to socio-cultural factors, which operate on their health behaviors and attitudes in order for us to increase our understanding of the associations between ethnicity, socio-economic status, and child mortality. For accomplishing these aims, community level investigations and comparisons of ethnic differences in each community in terms of formal education, maternal education, and level and quality of associations and proximity of members within a community can be meaningful and may provide us profound insight into the relationships between ethnicity, health, and social systems.

This study outlined ethnic identity, which developed and transformed into the competitive divisions within historical, political, and economic contexts. In this study, child mortality was employed as an indicator of socio-economic assessment and an outcome of mothers' livelihood which is shaped by and influencing everyday economic activities and cultural activities. Child mortality itself cannot explain the ethnic

differences between the two major ethnic groups directly; however, the quality of life, which is composed of multi-layered causations from politics to culture, may influence child well-being in various ways. The “quality of health” is composed of intricate combinations of perceptual, behavioral, and cultural characteristics. Over the long run, results of more in-depth research would be important to the formulation of public policy related to health programs. In many communities establishing timely and effective intervention of governmental health programs is imperative. A more complete socio-economic analysis of poly-ethnic communities in TT, emphasizing the cultural and customary differences in each community is needed in order to provide beneficial information capable of filling gaps in the understanding of Trinibagonian plural society and the appropriate administrative intervention in health care.

In the light of the irreplaceable peculiarity of this nation we should regard cultural conservation, economic opportunity, and allocational equality in scarce resources including health care variations, separately and equally. These competitions between ethnic groups enliven citizens of TT, which, I believe, are the culture and the preciousness of this nation.

APPENDIX  
LIST OF VARIABLES AND VALUES OF THE DEMOGRAPHIC AND HEALTH  
SURVEY IN TRINIDAD AND TOBAGO 1987 DATA

**Demographic**

ETHNIC: Ethnicity

<u>Value</u>	<u>Label</u>
1	African
2	Indian
3	Mixed
4	Other

Missing Values: 9

AGE: Current age – respondent

Scale

URBRURAL: Type of place of residence

<u>Value</u>	<u>Label</u>
1	Urban
2	Rural

MARISTA: Current marital status

<u>Value</u>	<u>Label</u>
0	Never married
1	Married
2	Living together
6	Visiting relation
7	Widowed/Divorced/Separated

**Socioeconomic**

EDSINGLE: Education in single years

Scale

Missing Values: 99

DWATER: Source of drinking water

<u>Value</u>	<u>Label</u>
1	Piped into residence
2	Piped into yard/plot
3	Public tap
4	Well with handpump
5	Well w/o handpump
6	River, spring, surface
7	Tanker truck, vendor
8	Rainwater
9	Other

Missing Values: 99

TOILET: Type of toilet facility

<u>Value</u>	<u>Label</u>
0	No facilities
1	Flush
2	Bucket
3	Pit
4	Other

Missing Values: 9

ELECTRI: Has electricity

<u>Value</u>	<u>Label</u>
0	No
1	Yes

Missing Values: 9

TV: Has television

<u>Value</u>	<u>Label</u>
0	No
1	Yes

Missing Values: 9

REFRIGE: Has refrigerator

<u>Value</u>	<u>Label</u>
1	No
2	Yes

Missing Values: 9

CAR: Has car

<u>Value</u>	<u>Label</u>
0	No
1	Yes

Missing Values: 9

FLOOR: Main floor material

<u>Value</u>	<u>Label</u>
0	Other
1	Wood planks
2	Cement
3	Dirt
4	Terrazzo
5	Parquet/polished wd
6	Carpet
7	Linoleum, vinyl
8	Ceramic tile

Missing Values: 9

VIDEO: House has video

<u>Value</u>	<u>Label</u>
1	Yes
2	No

**Child Birth Record (child number 1 to 16)**

[Child-1]

BIDX\$01: Birth column number 1  
Scale

BORD\$01: Birth order number 1  
Scale

B2\$01: Year of birth 1  
Scale

CALIVE01: Child is alive 1

<u>Value</u>	<u>Label</u>
1	No
2	Yes

[Child-2]

BIDX\$02: Birth column number 2  
Scale

BORD\$02: Birth order number 2  
Scale

B2\$02: Year of birth 2  
Scale

CALIVE02: Child is alive 2

<u>Value</u>	<u>Label</u>
1	No
2	Yes

[Child 3]

BIDX\$03: Birth column number 3  
Scale

BORD\$03: Birth order number 3  
Scale

B2\$03: Year of birth 3  
Scale

CALIVE03: Child is alive 3

<u>Value</u>	<u>Label</u>
1	No
2	Yes

[Child-4]

BIDX\$04: Birth column number 4  
Scale

BORD\$04: Birth order number 4  
Scale

B2\$04: Year of birth 4  
Scale

CALIVE04: Child is alive 4

<u>Value</u>	<u>Label</u>
4	No
2	Yes

[Child-5]

BIDX\$05: Birth column number 5  
Scale

BORD\$05: Birth order number 5  
Scale

B2\$05: Year of birth 5  
Scale

CALIVE05: Child is alive 5

<u>Value</u>	<u>Label</u>
1	No
2	Yes

[Child-6]

BIDX\$06: Birth column number 6  
Scale

BORD\$06: Birth order number 6  
Scale

B2\$06: Year of birth 6  
Scale

CALIVE06: Child is alive 6

<u>Value</u>	<u>Label</u>
1	No
2	Yes

[Child-7]

BIDX\$07: Birth column number 7  
Scale

BORD\$07: Birth order number 7  
Scale

B2\$07: Year of birth 7  
Scale

CALIVE07: Child is alive 7

<u>Value</u>	<u>Label</u>
1	No
2	Yes

## [Child-8]

BIDX\$08: Birth column number 8  
Scale

BORD\$08: Birth order number 8  
Scale

B2\$08: Year of birth 8  
Scale

CALIVE08: Child is alive 8

<u>Value</u>	<u>Label</u>
1	No
2	Yes

## [Child-9]

BIDX\$09: Birth column number 9  
Scale

BORD\$09: Birth order number 9  
Scale

B2\$09: Year of birth 9  
Scale

CALIVE09: Child is alive 9

<u>Value</u>	<u>Label</u>
1	No
2	Yes

## [Child-10]

BIDX\$10: Birth column number 10  
Scale

BORD\$10: Birth order number 10  
Scale

B2\$10: Year of birth 10  
Scale

CALIVE10: Child is alive 10

<u>Value</u>	<u>Label</u>
1	No
2	Yes

## [Child-11]

BIDX\$11: Birth column number 11  
Scale

BORD\$11: Birth order number 11  
Scale

B2\$11: Year of birth 11  
Scale

CALIVE11: Child is alive 11

<u>Value</u>	<u>Label</u>
1	No
2	Yes

## [Child-12]

BIDX\$12: Birth column number 12  
Scale

BORD\$12: Birth order number 12  
Scale

B2\$12: Year of birth 12  
Scale

CALIVE12: Child is alive 12

<u>Value</u>	<u>Label</u>
1	No
2	Yes

## [Child-13]

BIDX\$13: Birth column number 13  
Scale

BORD\$13: Birth order number 13  
Scale

B2\$13: Year of birth 13  
Scale

CALIVE13: Child is alive 13

<u>Value</u>	<u>Label</u>
1	No
2	Yes

## [Child-14]

BIDX\$14: Birth column number 14  
Scale

BORD\$14: Birth order number 14  
Scale

B2\$14: Year of birth 14  
Scale

CALIVE14: Child is alive 14

<u>Value</u>	<u>Label</u>
1	No
2	Yes

## [Child-15]

BIDX\$15: Birth column number 15  
Scale

BORD\$15: Birth order number 15  
Scale

B2\$15: Year of birth 15  
Scale

CALIVE15: Child is alive 15

<u>Value</u>	<u>Label</u>
1	No
2	Yes

[Child-16]

BIDX\$16: Birth column number 16  
Scale

BORD\$16: Birth order number 16  
Scale

B2\$16: Year of birth 16  
Scale

CALIVE16: Child is alive 16

<u>Value</u>	<u>Label</u>
1	No
2	Yes

### Maternal and Child Health Care Information (child number 1 to 6)

[Child-1]

PRENATA1: Prenatal care before birth-1

<u>Value</u>	<u>Label</u>
0	No one
1	Doctor
2	Trained nurse
3	Trained midwife
4	Birth attendant
5	Other

Missing Values: 9

MBREAST1: Months of breastfeeding-1

<u>Value</u>	<u>Label</u>
Scale	
94	Never breastfed
95	Inconsistent

Missing Values: 99

HCARD\_1: Has health card-1

<u>Value</u>	<u>Label</u>
0	No card
1	Yes, seen
2	Yes, not seen

Missing Values: 9

BCG\_1: Received BCG-1

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

DPT1\_1: Received DPT 1-1

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

POLIO1\_1: Received POLIO 1-1

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

DPT2\_1: Received DPT 2-1

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

POLIO2\_1: Received POLIO 2-1

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

DPT3\_1: Received DPT 3-1

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

POLIO3\_1: Received POLIO 3-1

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

MEASLE\_1: Received MEASLES-1

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9



CHIBORN1: Type of place child born-1

<u>Value</u>	<u>Label</u>
1	Government hospital
2	Private hospital
3	Private home
4	Other

Missing Values: 9

YFEVER1: Received Yellow Fever-1

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

[Child-2]

PRENATA2: Prenatal care before birth-2

<u>Value</u>	<u>Label</u>
0	No one
1	Doctor
2	Trained nurse
3	Trained midwife
4	Birth attendant
5	Other

Missing Values: 9

MBREAST2: Months of breastfeeding-2

<u>Value</u>	<u>Label</u>
Scale	
94	Never breastfed
95	Inconsistent

Missing Values: 99

HCARD\_2: Has health card-2

<u>Value</u>	<u>Label</u>
0	No card
1	Yes, seen
2	Yes, not seen

Missing Values: 9

BCG\_2: Received BCG-2

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

DPT2\_2: Received DPT 1-2

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

POLIO1\_2: Received POLIO 1-2

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

DPT2\_2: Received DPT 2-2

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

POLIO2\_2: Received POLIO 2-2

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

DPT3\_2: Received DPT 3-2

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

POLIO3\_2: Received POLIO 3-2

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

MEASLE\_2: Received MEASLES-2

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

CHIBORN2: Type of place child born-2

<u>Value</u>	<u>Label</u>
1	Government hospital
2	Private hospital
3	Private home
4	Other

Missing Values: 9

YFEVER2: Received Yellow Fever -2

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

[Child-3]

PRENATA3: Prenatal care before birth-3

<u>Value</u>	<u>Label</u>
0	No one
1	Doctor
2	Trained nurse
3	Trained midwife
4	Birth attendant
5	Other

Missing Values: 9

MBREAST3: Months of breastfeeding-3

<u>Value</u>	<u>Label</u>
Scale	
94	Never breastfed
95	Inconsistent

Missing Values: 99

HCARD\_3: Has health card-3

<u>Value</u>	<u>Label</u>
0	No card
1	Yes, seen
2	Yes, not seen

Missing Values: 9

BCG\_3: Received BCG-3

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

DPT1\_3: Received DPT 1-3

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

POLIO1\_3: Received POLIO 1-3

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

DPT2\_3: Received DPT 2-3

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

POLIO2\_3: Received POLIO 2-3

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

DPT3\_3: Received DPT 3-3

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

POLIO3\_3: Received POLIO 3-3

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

MEASLE\_3: Received MEASLES-3

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

CHIBORN3: Type of place child born-3

<u>Value</u>	<u>Label</u>
1	Government hospital
2	Private hospital
3	Private home
4	Other

Missing Values: 9

YFEVER3: Received Yellow Fever-3

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

## [Child-4]

PRENATA4: Prenatal care before birth-4

<u>Value</u>	<u>Label</u>
0	No one
1	Doctor
2	Trained nurse
3	Trained midwife
4	Birth attendant
5	Other

Missing Values: 9

MBREAST4: Months of breastfeeding-4

<u>Value</u>	<u>Label</u>
Scale	
94	Never breastfed
95	Inconsistent

Missing Values: 99

HCARD\_4: Has health card-4

<u>Value</u>	<u>Label</u>
0	No card
1	Yes, seen
2	Yes, not seen

Missing Values: 9

BCG\_4: Received BCG-4

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

DPT1\_4: Received DPT 1-4

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

POLIO1\_4: Received POLIO 1-4

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

DPT2\_4: Received DPT 2-4

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

POLIO2\_4: Received POLIO 2-4

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

DPT3\_4: Received DPT 3-4

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

POLIO3\_4: Received POLIO 3-4

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

MEASLE\_4: Received MEASLES-4

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

CHIBORN4: Type of place child born-4

<u>Value</u>	<u>Label</u>
1	Government hospital
2	Private hospital
3	Private home
4	Other

Missing Values: 9

YFEVER4: Received Yellow Fever-4

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

## [Child-5]

PRENATA5: Prenatal care before birth-5

<u>Value</u>	<u>Label</u>
0	No one
1	Doctor
2	Trained nurse
3	Trained midwife
4	Birth attendant
5	Other

Missing Values: 9

MBREAST5: Months of breastfeeding-5

<u>Value</u>	<u>Label</u>
Scale	
94	Never breastfed
95	Inconsistent
Missing Values: 99	

HCARD\_5: Has health card-5

<u>Value</u>	<u>Label</u>
0	No card
1	Yes, seen
2	Yes, not seen
Missing Values: 9	

BCG\_5: Received BCG-5

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know
Missing Values: 9	

DPT1\_5: Received DPT 1-5

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know
Missing Values: 9	

POLIO1\_5: Received POLIO 1-5

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know
Missing Values: 9	

DPT2\_5: Received DPT 2-5

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know
Missing Values: 9	

POLIO2\_5: Received POLIO 2-5

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know
Missing Values: 9	

DPT3\_5: Received DPT 3-5

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know
Missing Values: 9	

POLIO3\_5: Received POLIO 3-5

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know
Missing Values: 9	

MEASLE\_5: Received MEASLES-5

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know
Missing Values: 9	

CHIBORN5: Type of place child born-5

<u>Value</u>	<u>Label</u>
1	Government hospital
2	Private hospital
3	Private home
4	Other
Missing Values: 9	

YFEVER5: Received Yellow Fever-5

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know
Missing Values: 9	

[Child-6]

PRENATA6: Prenatal care before birth-6

<u>Value</u>	<u>Label</u>
0	No one
1	Doctor
2	Trained nurse
3	Trained midwife
4	Birth attendant
5	Other
Missing Values: 9	

MBREAST6: Months of breastfeeding-6

<u>Value</u>	<u>Label</u>
Scale	
94	Never breastfed
95	Inconsistent
Missing Values: 99	

HCARD\_6: Has health card-6

<u>Value</u>	<u>Label</u>
0	No card
1	Yes, seen
2	Yes, not seen
Missing Values: 9	

BCG\_6: Received BCG-6

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

DPT1\_6: Received DPT 1-6

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

POLIO1\_6: Received POLIO 1-6

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

DPT2\_6: Received DPT 2-6

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

POLIO2\_6: Received POLIO 2-6

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

DPT3\_6: Received DPT 3-6

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

POLIO3\_6: Received POLIO 3-6

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

MEASLE\_6: Received MEASLES-6

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

CHIBORN6: Type of place child born-6

<u>Value</u>	<u>Label</u>
1	Government hospital
2	Private hospital
3	Private home
4	Other

Missing Values: 9

YFEVER6: Received Yellow Fever-6

<u>Value</u>	<u>Label</u>
0	No
1	Yes
2	Mother reported
8	Don't know

Missing Values: 9

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## BIOGRAPHICAL SKETCH

Kuniko Chijiwa grew up in Fukuoka, Japan. She earned her first degree, a B.A. in industrial design at Tama Art University, Tokyo, Japan. She then worked for television advertising companies as a production manager. During these years she had several opportunities to work in developing countries, including the Caribbean region. In 1993, she returned to school to obtain a B.A. in social sciences at Waseda University. Her B.A. thesis was titled *The Economic Development in Caribbean States: The Future of Regional Economic Co-operation and the Re-Integration of Cuba* (written in Japanese).

Kuniko came to the University of Florida where she earned an M.A. in Latin American Studies. In the Fall of 2001 she entered the master's program in sociology at the University of Florida. In May 2003, she earned her second M.A. Her areas of academic interest are ethnic relations and social inequality; paying particular interest to how cultural variations incorporate the social status and the quality of health in multiethnic nations.