

An Epidemiologic Profile of the Primary Causes of Mortality Among the Elderly of Pedro Moncayo County, Ecuador, from 1991 to 1999

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Introduction

The health of the elderly is a topic of increasing importance as populations worldwide age. In the county of Pedro Moncayo, located in the Andean Mountains of Ecuador, seven percent of the population is aged 65 or older. As social living conditions improve, this proportion will continue to increase, a change that has large implications for public health in the area. Currently, the availability of health care within the county is extremely limited. In the case of the elderly, the situation is worsened due to several factors. These include a lack of transportation to health centers, a lack of financial resources for consultations and medications, and a higher prevalence of chronic illnesses that require consistent and long-term treatment.



An elderly couple on their way to work



A rural home in Tocachi, Pedro Moncayo County

By contrast, the incidence of tumors showed an increase during the study period while the incidence of chronic digestive system diseases remained constant.

•Most Prevalent Diseases within Primary Causes of Mortality

The most common types of circulatory system diseases (n=229) were cerebrovascular disease, cardiac failure, and insufficient cardiac output. The most prevalent types of tumors (n=87) were those of the stomach, uterus, prostate, liver, and colon. Of those respiratory system diseases (n=80), chronic pulmonary obstruction, pneumonia, bronchopneumonia, and chronic bronchitis were the most prevalent.

Discussion

As is true in developed countries and becoming more and more common in developing countries, the most common cause of death among the elderly of PMC was circulatory system diseases. While incidence of deaths due to these types of diseases decreased over the study period, the proportional mortality increased. The development of these conditions has been linked to certain risk factors including diets high in fats and cholesterol, little physical activity, high stress, smoking, drinking, and family history of the disease.

Both the proportional mortality and the incidence of tumors, the second most prevalent cause of death, were found to increase among the study population, a trend that is also occurring in Ecuador in general. The most common type of tumor among the elderly was that of the stomach. Past studies have shown the development of stomach cancers to be associated with poverty as well as diets containing high levels of carbon, heavy metals, and nitrosamines.

Recommendations

As previously noted, the population of the elderly for each year of the study was projected under the assumption that the percent of the population composed by this subgroup did not change. Thus it is recommended that when the data from the SIISE 2001 census becomes available, the populations of the elderly be recalculated to provide more accurate incidence rates.

In order to lower the incidences of death among the elderly that are the result of the diseases identified by the study, it is necessary to determine the prevalence of any risk factors shown to correlate with development of these diseases. With a knowledge of the risk factors present in the county, leaders can then implement programs aimed toward reducing their prevalence, assuming that funding can be made available.

Objectives

This project sought to (1) determine the primary causes of mortality among those aged 65 and older in PMC; (2) establish the epidemiologic profile of these primary causes of death over the study period; and (3) determine the most prevalent diseases within each primary cause of death category.

Methods

- Target Population: Those persons aged 65 and older living within the five parishes of Pedro Moncayo County from 1991 to 1999

- Interpolated parish and county populations for each year of the study period using 1990 and 2001 National Census data obtained from the System Integrado de Indicadores Sociales del Ecuador (SIISE)

- Calculated the population comprised by the elderly subgroup for each year by projecting the percent comprised by this population subgroup in 1990 through the year 1999. This calculation assumes that the percent of the population comprised by the elderly did not change over the study period and thus is a limitation.

- Utilized the mortality database of Pedro Moncayo County from 1991-1999 collected by the Instituto Nacional de Estadísticas y Censos (INEC) to calculate elderly proportional mortality and mortality rates by cause of death for each year and parish.

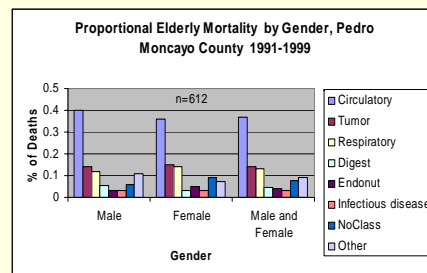


Figure 1. The data show little difference in proportional mortality between males and females.

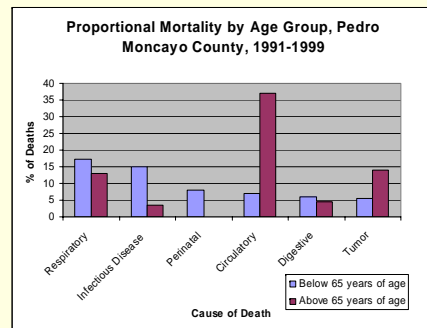


Figure 2. The largest differences in proportional mortality among the elderly vs. those under 65 are in circulatory system diseases, tumors, perinatal conditions and infectious diseases.

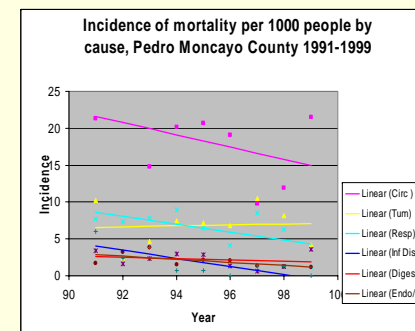


Figure 3. Deaths caused by tumors were the only type found to increase in incidence over the nine year study period.

Results

Primary Causes of Mortality

The six most prevalent causes of mortality among the elderly were circulatory system diseases (37%), tumors (14%), respiratory system diseases (13%), chronic digestive system diseases (5%), endocrine system and nutrition-related disorders (4%) and infectious diseases (3%) (n=612)

•Epidemiologic Profiles of the Primary Causes of Mortality

The incidences of circulatory system, infectious, respiratory system, and endocrine/nutrition related diseases were found to decrease over the time period encompassed by the study.

Risk Factors of Hypertension in Adults Over 30 Years Old in Pedro Moncayo County, Ecuador

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Introduction:

Just as in other countries and communities around the world, in the county of Pedro Moncayo, Ecuador, high blood pressure or hypertension, represents a relatively prevalent and important health concern. Hypertension, an important determinant of cardiovascular disease, has been shown to be associated with increasing age, obesity, and lifestyle characteristics including physical inactivity, smoking, and alcohol consumption. Unfortunately, relatively little is known about the epidemiology of hypertension in Ecuador. In a survey conducted in the parish of Tocachi in Pedro Moncayo County in 2000, results found a prevalence of high blood pressure that was much greater than the estimated 8-18% prevalence of hypertension worldwide. Hypertension also contributes significantly to other cardiovascular diseases and is often the indirect result of death, going unnoticed throughout the years, making it an unsuspecting accomplice to many different cases of mortality. Cardiovascular diseases have shown a steady increase in the Andean areas of South America. Between 1980-1985, mortality rates as a result of a disease of the circulator system were 256.2 in men and 217.8 in women. Over the same time period, between 1990-1995, those rates have increased to 274.8 and 239.7 respectively.

Purpose:

To establish an elementary foundation of knowledge and indication of the levels of hypertension within the community of Pedro Moncayo with respect to certain risk factors; and to recommend implementation of certain basic steps to improve the education surrounding hypertension in the county.

Objectives:

- Determine the prevalence of hypertension in Pedro Moncayo County
- Determine which correlations (if any) exist between blood pressure and the following risk factors of hypertension: sex, alcohol consumption, smoking, marital status, job conditions, and body mass index in individuals over 65 years of age
- Identify ways of improving the knowledge of factors and results of hypertension for the county of Pedro Moncayo

Methodology:

Using information from a recently completed health survey and vital records data for Pedro Moncayo County for 1991-1999, we sought to identify hypertension risk factors in this understudied population. This analysis was limited to 525 individuals for whom both systolic and diastolic blood pressure data were available. Variables with large numbers of unique values were re-coded into new variables of groups of values to make the data manageable for statistical analysis and presentation, but the integrity of the data was maintained. Statistical analysis of the data was achieved with SPSS 11.0 for Windows. Two-tailed Pearson chi-squared tests were used where applicable.

Results:

We noted that the prevalence of hypertension was approximately 18% in Pedro Moncayo; and that males were more likely than females to be hypertensive. Individuals with hypertension were more likely than normotensive individuals to be widowed (15.1% vs., 7.7%), though this difference did not reach statistical significance. We did not note significant differences in the body mass index distributions for hypertensive and normotensive subjects. Smoking and alcohol consumptions were not found to be risk factors in this population.

Figure 8: Marital Status Distribution of Non-Hypertensive Population

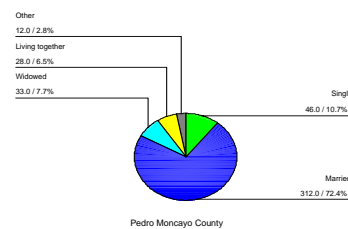


Figure 9: Marital Status Distribution of Hypertensive Population

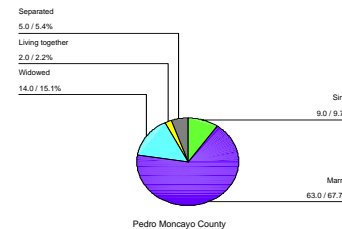


Figure 4: Sex Distribution of Non-Hypertensive Population (N=432)



Figure 5: Sex Distribution of Hypertensive Population (N=93)

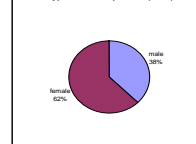


Table 19: Grouped diastolic blood pressure * Do you smoke? Crosstabulation

Count	Do you smoke?		Total
	No	Yes	
Diastolic blood pressure (mmHg)			
40-49	4		4
50-59	16	1	17
60-69	83	7	90
70-79	120	23	143
80-89	101	25	126
90-110	51	6	57
Total	375	62	437

Table 20: Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	9.020	5	.108
N of Valid Cases	437		

Conclusions:

Using available data, we attempted to identify risk factors for hypertension in a county in Ecuador. Although available data suggests that some risk factors for the disorder may be prevalent in our study population, inferences from our study were limited by our relatively small sample size and a high proportion of missing information for key variables. This analysis underscores the need for the design and careful execution of a population based study aimed at confirming the prevalence of hypertension and the identification of risk factors among the residents of Pedro Moncayo County, Ecuador.

Family histories, dietary information, etc. are essential, and they must be collected in an organized and efficient manner, keeping the quantity of missing data to a minimum. Additionally, any confident diagnosis of hypertension involves repeated measurements of blood pressure with close monitoring of the patient over an extended period of time. An accumulation of this kind of data over the years, and following the surveyed until death could yield important relationships between lifestyle and blood pressure and consequently cause of death. Furthermore, a complete database will allow risk factors to be identified with confidence, thereby identifying target groups that are at greater risk of developing hypertension and require the most attention.

Programs of education in control and prevention will go a long way in serving to better the health of the community. The Organización Panamericana de la Salud and the Organización Mundial de la Salud have extensively outlined programs already established with similar aims and should be considered as possible alternatives.



Incidence of Mortality due to Infectious and Respiratory Diseases in Pedro Moncayo County, Ecuador, 1991-1999

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Introduction

Infectious and respiratory diseases, although, preventable and easily treated, continue to pose serious health implications for populations in developing countries. Like many developing countries, due in part to the country's high poverty levels and related poor living conditions, Ecuadorians are facing major health problems including high morbidity and mortality rates attributable to respiratory and infectious diseases. Comprised mostly of *Mestizos* and some indigenous people, Pedro Moncayo County (PMC) is a rural county, which is located outside of Quito. Residents of this region of Ecuador also struggle with inadequate access to health care, where it heightens the public health impact of infectious and respiratory disease among the population of PMC.



Field Work, Tocachi, Ecuador



Indigenous Elder, Tocachi, Ecuador

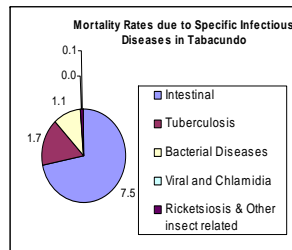
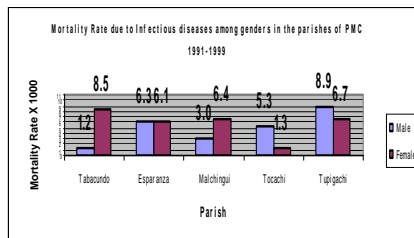
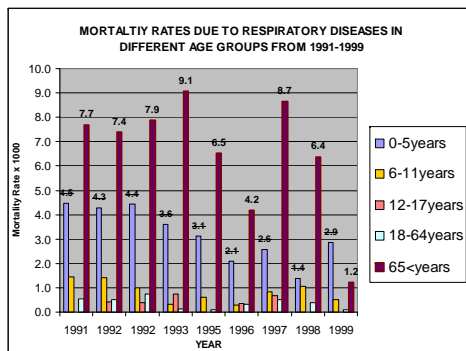
Objectives

This study sought to (1) determine the distribution of mortality rates due to infectious and respiratory diseases in the five parishes of Pedro Moncayo County (PMC), Ecuador (2) identify the extent to which members of different age and gender groups were affected by infectious and respiratory diseases in the county (3) identify most prevalent infectious and respiratory diseases which count for incidences of mortality in the county.

Methods

Descriptive statistical analysis was conducted using vital records and census databases provided by the Sistema Integrado de Indicadores Sociales del Ecuador and the Instituto Nacional de Estadística y Censos de Ecuador. The period of observation was restricted to 1991-1999, and only the population residing in PMC was eligible for inclusion in our analysis. Infectious disease-mortality rates were calculated according to different social and demographic characteristics.

*Statistical analysis was done by using SPSS 11.0 and Windows Excel 7.0 software programs. This research analysis is mainly focused on mortality rates (MR) of PMC due to infectious and respiratory diseases.



Results

Age Specific Mortality

Mortality rates due to infectious and respiratory diseases were highest among the elderly (i.e., those over age 65 years of age), and among infants and children (less than 5 years of age). There were (n=56) cases of deaths due to infectious diseases among the >5 years age group, which was the highest number of cases among all the age groups. The average mortality rate in this age group was (M=2.01), which was the highest MR in every age group during 1991-1999 due to infectious diseases.

Gender Specific Mortality

We noted that males experienced the highest mortality (8.9 per 1,000 population) due to infectious diseases and also the highest MR (7.4 per 1,000 population) in respiratory diseases.

Disease Specific Mortality

Intestinal infections were the most common specific type of infections associated with mortality. Tabacundo has the highest mortality rate (M=7.5) due to intestinal infections among all the five parishes. Other infections contributing to the mortality in this population included the common respiratory infections - pneumonia and influenza. Infectious disease mortality rates varied considerably across the 5 parishes of PMC

Conclusions

In PMC, children (>5 years) and the elderly (<65 years) are at high risk of dying due to respiratory and infectious diseases.

Males in PMC experience high mortality due to both respiratory and infectious diseases compared to their female counterparts.

Intestinal infections count for high mortality due to infectious diseases in all the five parishes, while Pneumonia and influenza count for high mortality due to respiratory diseases in all the five parishes.

Recommendations

Access to health care for these populations must be improved within each parish. Causes of specific respiratory and infectious diseases must be investigated and prevention programs should be developed.

Limitations

Data available for analysis was limited to vital statistics provided by the Ecuador census department. Some of mortality and mortality data were not complete, which prevent us from attaining the true magnitude of health problems facing this community.



This research was conducted in association with the Multidisciplinary International Research Training (MIRT) Program. This work was supported by a grant from the Fogarty International Center, National Institutes of Health to the University of Washington.

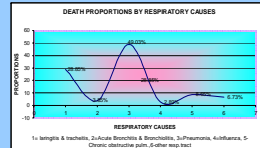
Social and Housing Environmental Conditions Influencing Infant Mortality Under One Year of Age attributable to Respiratory Infections in Pedro Moncayo County, Ecuador

Geraldine Chery and Jose Suarez, MD, MPH, PhD

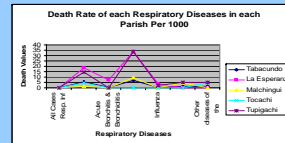
Multidisciplinary International Research Training Program, University of Washington, Seattle, WA, USA and Fundacion Cimas del Ecuador, Quito Ecuador



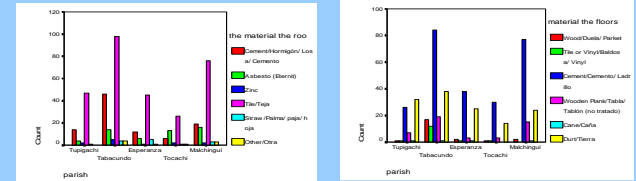
GRAPH 1: Mortality Proportion of different causes of Respiratory Infections.



GRAPH 2: Death Rates of Respiratory Diseases in Each Parish (Per 1000)



GRAPH 4: Materials The Roofs, Walls and Floors are Made of (by counts)



Introduction

Respiratory infections are the most common diseases that have a big and important impact on children everywhere, especially in the developing countries. In Ecuador, particularly Pedro Moncayo, which is made up of 5 parishes: Tupigachi, Tabacundo, La Esperanza, Tocachi and Malchingui, a high percentage, of the population is living below poverty. According to studies, houses covered with straw roofs, zinc roofs, dirt floors and planks, are associated with health conditions such as chronic obstructive pulmonary problems, and acute respiratory infections including pneumonia. Moreover, people that use wood and carbon as materials to cook with are also endangering the health of infants, because breathing these materials on a regular basis can be dangerous to the respiratory system, especially in children under 1 year of age. Moreover, the same aspect goes to using the same room that they sleep in as a form of kitchen, and whether or not they dispose their garbage inside their property or on the street or burning it. These factors contribute to the health status and mortality of infants and this study seeks to evaluate them.

Objectives

In this study, we sought to:

- Describe the six main causes of respiratory infections associated with the mortality of infants under one year of age among the 5 parishes of Pedro Moncayo County for a period of nine years, 1991-1999.
- Establish eight conditions that might be risks factors influencing the different respiratory causes within each parish. Factors such as; housing environmental conditions and the types of activities that is performed, and how well these activities contribute to the endangerment of the health of infants.
- Evaluate the trends of the different conditions influencing respiratory diseases in the county by preparing a specific report by parish.
- To establish the specific infant mortality rate by parish for different causes affecting infant population among the five parishes of Pedro Moncayo County.

Methods

Using vital records data, we identified six respiratory diseases to be causes of mortality of 104 (22.22 per 1,000) infants from a cohort of 4,681 births within the five parishes to assess a case-descriptive study to determine causes of death, places of death, death rates and proportions, year of death and factors that might have an influence on the different causes of death by parish, for a period of nine years, 1991 to 1999. We utilized databases from Fundacion Cimas Del Ecuador, Instituto Nacional De Estadísticas Y Censos (INEC) and an offer and demand surveys. The offer and demand survey was updated and formulated in 2001, by students from the Multidisciplinary International Research Training Program, (MIRT). 477 cases were evaluated and to tabulate the analyses, we used different tabulation formats such as, one-way ANOVA and Post Hoc Multiple Analysis using the Bonferroni method.

Results

We found that the total death rate was higher in La Esperanza and Tupigachi and this pattern has been the same for different causes of death. The materials the walls, what the floors are made of, the type of fuel they cook with, and where they dispose their garbage, were found to be possible risk factors.

Materials of roofs

In general, the means of the death rates due to respiratory causes between any of the types of housing, the materials that the roofs were made of and types of common activities, were found to have no significant difference, thus, we can not conclude that they are potential risk factors. When comparing these conditions to their protective risk factors, they were found to have no differences with any of the possible risk factors.

Material of Floors

When comparing the protective factor, which was cement in this case, we found that there were possible risk factors associated with floors that were made with dirt.

Materials of walls

We compared the materials that the walls are made with, to the protective factor, in this case was blocks or bricks, we found that those houses that were made with mixed mud were possible risk factors. There were more houses in La Esperanza that were made with such conditions, thus, associating this with the arid climate that is there, this surely can have a great affect on infants.

Type of fuel used to cook

The type of fuel of the populations used to cook with, there were possible risks factors associated with using both, carbon/wood and gas/wood when compared with the protective risk factor, which was the use of gas only. Adding this condition to the construction of the walls pose possibly even greater effects. Thus, the parish that had both of these conditions would be exposing these infants to two possible risk factors that can result in chronic obstructive pulmonary diseases.

Trash disposal

Upon analyzing these conditions, it was hard to believe that there were only nine cases of chronic obstructive pulmonary diseases. In reference to the disposal of the garbage, we found that burning the garbage, dumping it on the streets, and dumping it inside the property were possible risk factors when compared to the collection of it by garbage trucks, which was the protective factor.

Conclusion

In conclusion, in previous studies, there have been many factors influencing the mortality of infants under 1 year of age due to respiratory diseases. In this study of infantile deaths of a period of nine years, 1991 to 1999, we found possible risk factors associated with certain housing conditions such as; the materials the walls, the floors were made of, the type of fuel used to cook with, and the disposable of the garbage. Moreover, we found that conditions such as the locations used as a kitchen, the materials the roofs are made of and the types of activities all were found to have no potential risk factors in aggravating the respiratory deaths in infants among each parish.

Limitations

One limitation to this research was that, when observing the conditions in each variable, a lot of them had "others" as a condition. This came to be a problem because those cases that said others could be any one of the causes. As a recommendation, it would be better for authorities when collecting data, to specify what each aspect is, instead of using the word "others" to categorize conditions, which, in these cases have no meaning, because we don't know what they are. By being specific, it would be easier to determine accurate ratios.

Recommendations

To prevent more deaths from occurring by these diseases, it would be an advantage for health personnel and authorities to organize more health education and promotion programs that would gear toward informing each community about environmental health hazards. Moreover, leaders of each community need to set standard for housing conditions as to the appropriate and inappropriate housing conditions in each community. There should be laws that prohibit certain housing conditions that would be a health concern to infants in each community. There need to be provision strengthening programs in each community that would help disadvantage people. These provision-strengthening programs would consist of donation of goods and housing equipment.



This research was conducted in association with the Multidisciplinary International Research Training (MIRT) Program. This work was supported by a grant from the Fogarty International Center, National Institutes of Health to the University of Washington.



Informed Consent: Challenges in the Application of the American Standard When Using the Quichua Population of the Andes as Subjects

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Background:

In recent years, the amount of human subjects research carried out by developed countries within the poorest sectors of the least wealthy nations has expanded to alarming levels. Institutional Review Boards (IRB) in the United States stress the importance of protecting foreign human subjects as stated in American regulations. Nonetheless, one often encounters resistance from bioethics authorities when deviating from the American/Western standards of informed consent. This has been the topic of vigorous discussion and the frustration of many international researchers.

The indigenous communities, the Quichuas, of the Andean region of South America are often subjects in international research. Their history shows how more than five hundred years of exploitation has shaped their reality. They often lack basic living conditions as well as educational and medical services. This study was primarily focused on the Quichua nationality of the provinces of Pichincha and Imbabura in Northern Ecuador.

Objectives:

This investigation aimed to identify aspects of the Quichua culture that hinder the application of the American standard of informed consent, and to find tactics to ease such barriers. Hopefully, it serves as guidance for IRB commissions in the US to better understand the Quichua population, and for the Ecuadorian authorities to implement measures that protect its citizens in human subject research.

Methodology:

This study was based on interviews with experienced researchers in Ecuador and personal observations. This allowed us to identify cultural differences that were examined in the context of the application of informed consent.

Theoretical framework and Background information:

The Nuremberg code identifies four characteristics that are indispensable to obtain valid consent—*informed, voluntary, legally competent, and comprehending*.

The informed consent process, as defined in the Belmont Report, requires three basic ethical elements—*information, comprehension, and voluntariness*.

Ethical Relativism claims that ethic principles are limited to culture, but it can contribute to the violation of human rights.

Ethical Imperialism conflicts with the notion of respect for person by arguing that ethical values are universal.



Bottom row pictures from *BellSouth Magazine*, Nov, 1999, no. 4

Discussion:

Information and Comprehension:

Some relevant information that must be disclosed may not be relevant for the Quichuas. Their view of "being healthy" and the way they believe that diseases are acquired, hinder information sharing.

Educational level limits their understanding but not the informed consent process.

Voluntariness:

This people rely on community leaders for guidance in almost every aspect of their lives. Often these leaders are the ones who consent to an investigation, thus several ethical questions arise.

Since reciprocity is a very important aspect of their culture, they expect something in return for participating in a study. This should not be confused with a form of coercion.

Legal competence:

Adulthood is not age dependent in the Quichua culture. We often find under-aged parents consenting for their children. This issue conflicts with our views on the autonomy of children.

Privacy of the body is also an important cultural aspect that must be considered by American researchers.

Conclusions:

Obviously, the cultural differences between Quichuas and Americans are significant. On the topic of informed consent, these discrepancies are not irresolvable if some degree of Ethical Relativism is employed.

Recommendations:

- The Ecuadorian government should promote programs to increase the number of Quichuas (and other minority groups) at higher educational levels that will allow them to participate in the decision making process for policies that directly affect their communities.
- No research should be conducted with the Quichua population unless the results will quickly, effectively and directly benefit their community.
- Inventive ways of disclosing information should be developed because low level of literacy is commonly encountered among Quichuas. After this has been accomplished, the information must be tested for culturally contradictory topics.
- If some of the information pertinent to the investigation is culturally problematic, a culturally competent way of disclosure should be developed with the help of community leaders.
- If there is definitely no way of adapting the information, and the study is ABSOLUTELY necessary for the well being of the community, then limited disclosure should be considered.
- Group consent should be considered as sufficient, and we should not offer any paper for possible subjects to sign after their leaders have consented.
- Researchers should respect the Quichua's reciprocity custom and should offer something in return for their participation in a study. Whatever is offered must be discussed with community leaders first and for the benefit of the whole community and not of the leader alone.
- The investigators should avoid, as much as possible, using children under 18 years of age in the study regardless of their adult status in the community.
- When the research involves the children of underage children, and the benefits of the study are ABSOLUTELY necessary for their well being, then the consent from the child's parents should be requested.
- If an investigation requires examining the body of the subject (especially that of a woman) it should be done in a culturally competent manner.

This research was conducted in association with the Multidisciplinary International Research Training (MIRT) Program. This work was supported by a grant from the Fogarty International Center, National Institutes of Health to the University of Washington.



Cross-Sectional Study of Availability of Health Care Services and Living Conditions for Indigenous vs. Mestizo Population in Pedro Moncayo County Ecuador

Jennifer Maria and Dr. Jose Suarez

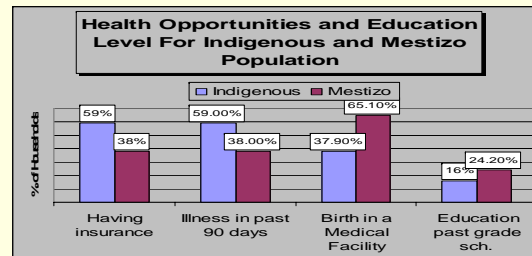
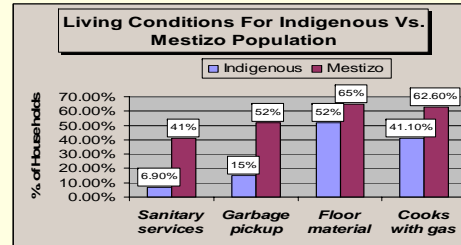
MIRT Program, University of Washington, Seattle, WA, USA and Fundación CIMAS del Ecuador

Background and Objectives:

Pedro Moncayo County (PMC), located in the Pichincha Province of the Northern Orient region of Ecuador, has a population of 26,700. Approximately 52% of the residents of PMC live in urban areas, while the remaining 48% live in rural areas. The biggest of the five parishes in Pedro Moncayo is Tabacundo, which has 37.5% of the population, and 62.5% reside in Tupigachi, La Esperanza, Malchingui, and Tocachi. In this county the majority of the habitants are Mestizo, which largely live in urban parts of the county. The majority of the rural areas are inhabited by the Indigenous groups, of which a high percentage live an agricultural life that is a traditional part of their lives. In Pedro Moncayo County alone 36.6% live below poverty lines and social growth is marked at 71.8%. The aim of this study was to evaluate the extent to which health and social status differed for members of the Mestizo and Indigenous populations.

Methods:

This is a cross sectional survey research, using information from a survey that was completed in July 2001. The variables analyzed were chosen from this survey and broken down into two groups, Indigenous and Mestizo for comparison between the two groups, which are the Indigenous populations and the Mestizo population. The sixteen variables and ten significant variables were analyzed in terms of the two ethnic groups.



The survey was given to 49 communities and 477 families, out of these only 158 said they were Indigenous and 319 said they were Mestizos. SPSS 11.0 for Windows was used for statistical analysis of the data. The data was analyzed using frequencies and cross-tabulation tables.

Results:

We noted significant differences across the two ethnic groups. As the results illustrate, there was a significant difference between the two groups. Living conditions were far less well developed for Indigenous, as compared with the Mestizo population. Additionally, the Indigenous population had a higher rate of inadequate sanitary services and was more likely to utilize community clinical and hospitals than members of the Mestizo community.

Conclusion:

These data suggest that much work needs to be done to address the health disparities noted in this study between the Indigenous and Mestizo communities in Ecuador.



This research was conducted in association with the Multidisciplinary International Research Training (MIRT) Program. This work was supported by a grant from the Fogarty International Center, National Institutes of Health to the University of Washington.

An Assessment of Trends and Risk Factors of Mortality in Pedro Moncayo County, Ecuador During the Years of 1991 and 1999

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OBJECTIVE

To examine the risk factors and trends in relation to mortality rates within and throughout the five parishes of Pedro Moncayo County. Also, to assist future researchers in determining the problems that are affecting the Pedro Moncayo County, so that they can improve the way and quality of life in this area.

INTRODUCTION

As is the case in many developing countries, Ecuador has many areas of poor living conditions, environmental conditions, work conditions, etc. Pedro Moncayo County and its five parishes are no exception. It has very poor conditions in relation to the sanitation, hygiene, education, and in general the health of the people in this area. As a result of this there exists several negative health issues.



METHODOLOGY

This study was conducted through Fundacion CIMAS del Ecuador using a database comprised of information from the 1991-1999 surveys that was collected by the Instituto Nacional de Estadística y Censos (INEC) in Ecuador. The survey contained information regarding the amount of deaths, causes of death, ages at time of death, living conditions, education and other similar factors that influence death rates.

RESULTS

Of all those who died, 41% were above the age of 65, 26% were between the ages of 19-64, and 27% were below the age of five. Of those below the age of five, 75% were infants (1 year of age and below). The highest number of deaths took place in Tabacundo (46%). Tupigachi contained 20% of the total deaths, La Esperanza 13%, Malchingui 15% and Tocachi 6%.

Those who do not work die at a higher rate (47%) when compared to those that do. The leading causes of death in Pedro Moncayo County were circulatory diseases, respiratory diseases, infectious diseases, and tumors.



This research was conducted in association with the Multidisciplinary International Research Training (MIRT) Program. This work was supported by a grant from the Fogarty International Center, National Institutes of Health to the University of Washington.

CONCLUSION

In reference to age group, there is a higher rate of deaths for those above the age of 65 (41%). However, about 27% of the deaths occur among children under the age of five years; and among these over 75% of those are infants. We also found that generally, those who do not work are dying at a much higher rate than those who do. Of all the causes of death in Pedro Moncayo County, circulatory causes seem to be the most prevalent in every parish under mostly all variables. Of all the people who died in each individual parish, Tocachi, the parish with the smallest population, has the highest percentage of deaths due to circulatory causes.

RECOMMENDATIONS

Improve the system of collecting information. The high percentages of “no data” and “other” make it difficult to achieve a quality analysis of the problems/risks and trends. Find better ways to distribute health facilities throughout the county.



**The Incidence, Trends, and Risk Factors of Malignant Neoplasm:
An Epidemiological Surveillance in the Pedro Moncayo County, Ecuador**
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Introduction:

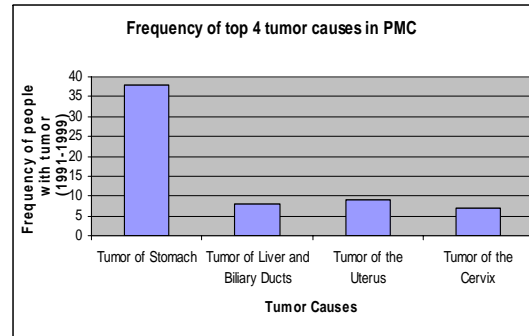
Ecuador is a third world country facing the harsh realities of the debt-burden incurred during its petroleum boom. This debt-burden has affected the resources available for providing health-care services to the citizens of the country.

Objective:

The collection and transmission of diseases for the Pedro Moncayo County has already been undertaken and completed. This study is conducted to continue the epidemiological surveillance process for the Pedro Moncayo County, Ecuador, in hopes to possibly reduce to cancer incidences. Through integration of the databases provided, identification of highly risked groups can be determined, and initiatives can then be taken to address the problem. After completing this study, a better understanding on how to integrate databases, how to use different methods of epidemiological and disease surveillance analyses, and working with a limited amount of resource will be achieved. This will provide tools for future public health servicing.

Methods:

We used vital record databases (for the period 1991-1999) and data from a previously conducted cross-sectional population-based survey to conduct the present analytical study. After linking these databases, we had 477 subjects available for analysis. Socio-demographic, health and behavioral variables were abstracted from the survey databases, and we estimated cancer incidence and prevalence rates according to these covariates.



Results:

From data analysis we noted that:

- *tumors of the stomach, cervix, liver, and uterus were the four most prevalent cancers in this study population.*
- *that subjects over 65 years of age, particularly women, experienced the highest risk of developing malignant tumors.*
- *our sample was too small to allow for careful descriptions of possible differences in patterns to assess the parish-specific cancer trends and risk factors.*
- *the data used in the analysis were insufficient in providing for possible establishment of cancer trends in the Pedro Moncayo County region of Ecuador.*

Conclusions:

Currently, there are very few population-based studies of cancer morbidity and mortality in Ecuador. Results from our preliminary study underscore the need for focusing greater attention on describing the epidemiology of cancer among citizens of Ecuador. Possible risk factors may include increased age, gender and exposure to chemicals and pesticides.

Recommendations for future studies:

Recommendations for future studies are to conduct the analysis as a cohort or case study. Oncological studies should be studied as controlled cases due to the chronic nature of tumor development. A longer time frame and more referential information should be used to compare the analyses. Another recommendation is to conduct future studies on morbidity data and not just mortality data because possible bypasses on tumors could have taken place, causing possible bias in any conclusion drawn in this study.



Analysis of the Epidemiological Transition in Pedro Moncayo County, Ecuador

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Introduction:

The classical definition of the epidemiological transition refers to the advent of industrialization in Western Europe and the subsequent changes in the patterns of diseases. Prior to the age of industrialization, infectious diseases were rampant but afterwards the pattern shifted to chronic, degenerative diseases. The idea of an epidemiological transition will be applied to Pedro Moncayo county in Ecuador. Ecuador has experienced many changes since the discovery of oil in the 70's. Since then the country has accumulated a large amount of foreign debt and is currently decentralizing the government. In addition the county in the study contains a large flower plantation. One of the many characteristics of these plantations is their overuse of pesticides, all of which will affect the health of the people in this country. Additionally, many of the able bodied individuals in the county are employed by these plantations.

Objective:

The main objective of this study was to determine the location of Pedro Moncayo within the epidemiological transition. Assessment of both chronic and infectious trends would allow public health officials to increase the effectiveness in the allocation of public health dollars.

Methodology:

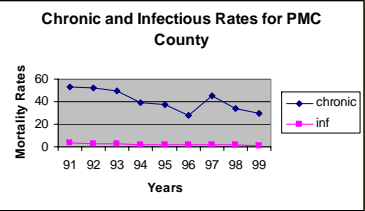
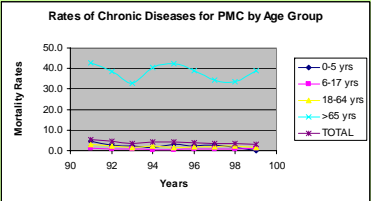
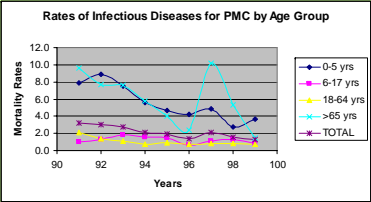
This analysis was made possible through the use of INEC mortality data and population data from SIISE. From this data, four age groups were created and each disease was grouped either as infectious or chronic. Within these categories, analysis was done for each parish, age group, and also within the top five diseases within the county.

Results:

From preliminary analysis, circulatory, respiratory, infectious, tumor, and digestive diseases were the leading causes of death for the 9-year period.

- Circulatory- 19.5%
- Respiratory- 15.5%
- Infectious- 10.3%
- Tumor- 9.1%
- Digestive- 5.6%

Looking only at infectious diseases, they are on the decline. Infectious diseases however continue to claim the lives of a high proportion of individuals in age group 1 and 4.



Chronic diseases, however, stay fairly constant but the rate remains very high. The high rates mainly affect age group 4. Circulatory, chronic respiratory, and tumors characterized the top three diseases within the chronic category for age group 4. Within the counties, La Esperanza and Tocachi remained well above average in the chronic categories for age group 4. The graph below illustrates both the chronic and infectious disease trends for all of Pedro Moncayo county and for all ages.

Conclusions:

From the data analyzed, infectious diseases are on the decline and chronic diseases have remained constant throughout the nine-year period. Age group four, however, is the most affected for both the chronic and the infectious diseases. The rates especially for chronic diseases remain considerably high (37). In order to properly assess the epidemiological transition in Pedro Moncayo county more data will be needed. Morbidity data would be an excellent supplement and helpful in a complete interpretation of the health situation in this county. Hopefully through this research gaps can be filled and the public health system can more effectively allocate money within this county.

Limitations:

One of the major limitations in the study concerned the timeline of the mortality data (9 years). In order to properly analyze the epidemiological transition a researcher would need at least 20 years. Furthermore, mortality rates only give half the picture and would need to be supplemented with morbidity data. Lastly, there were many cases that when recorded using the international codes were nonspecific deaths.



This research was conducted in association with the Multidisciplinary International Research Training (MIRT) Program. This work was supported by a grant from the Fogarty International Center, National Institutes of Health to the University of Washington.

Assessment of the Ten Most Important Causes of Mortality and Health Trends Among Men and Women in Pedro Moncayo County, Ecuador: 1991-1999

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OBJECTIVE

This project sought to 1) identify the most important causes of mortality in Pedro Moncayo County; 2) determine how the incidence of mortality relates to specific age groups and gender; and 3) to establish significant trends that will be analyzed for the most important causes of mortality. Results from these analyses are likely to be useful as a baseline against which results from future health surveillance projects can be compared.

INTRODUCTION

The healthcare and well-being of men and women of all ages are strongly reliant on the availability of and access to health resources and coverage, and to public services such as drinking water and basic sanitation. The modernization of health care development and state processes in Latin American countries have impacted the economic dynamics and overall health care systems. According to the Pan American Health Organization (PAHO), in 1995, it was estimated that 63% of the total population was affected by some degree of poverty compared with 54% in 1990. As poverty increases so does the potential to develop chronic disease, and as a result, innocent people die.

Pedro Moncayo County, located in the sierra region of Ecuador, has a population that can be described as 52% rural and 48% urban. The primary source of income for residents comes from flower plantations. Approximately 30% of the flower industries do not have the proper technologies to handle contamination problems secondary to the use of pesticides, herbicide and other industrial chemicals. As a result, there has been increasing concerns about the public health impact of the expanding agricultural enterprise in Pedro Moncayo County.

METHODS

This project is a descriptive analysis of mortality information from Pedro Moncayo County for the years 1991-1999. The investigation was performed at the Fundacion CIMAS del Ecuador in Quito, Ecuador. Mortality data was obtained from the following sources including Instituto Nacional de estadística y censos (Inec) Mortality Censos, 1991-1999, and from Sistema Integrado de Indicadores Sociales del Ecuador (SIISE), Population Censos 1990. The 1991-1999 mortality data and the census data of 1990/2001 were then incorporated into Microsoft® Excel 2002 SP-1 and used for data analysis throughout this study. We noted that 772 deaths (from a total 1482 in the county during the study period) accounted for the top ten causes of death. Mortality rates were calculated using Microsoft® Excel 2002 SP-1.

Ten Most Important Causes of Death in Pedro Moncayo, 1991-1999.

CAUSE OF DEATH	91	92	93	94	95	96	97	98	99	Grand Total
1. Cardiovascular disease	14	21	9	18	20	17	22	20	32	169
2. Pneumonia and Influenza	18	16	17	14	12	9	20	8	12	126
3. Cerebrovascular disease	21	21	12	16	11	14	7	5	9	116
4. Intestinal Infection	13	17	14	12	13	7	8	10	2	96
5. Malignant Tumors of the Digestive Tract	10	1	3	8	8	10	11	7	5	63
6. COPD	7	8	6	7	8	5	3	6		50
7. Nutritional Deficiencies	11	8	6	4	6	6	4	1	2	48
8. Vehicle Transport Accidents										39
9. Tuberculosis	9	5	3	3	4	4	2	1	4	35
10. Senility	1	7	1	4	4	6	4	3		30

Mortality Rates due to the Most Important Causes of Death by Age Groups in Pedro Moncayo, 1991-1999.

CAUSE OF DEATH BY AGE GROUPS	0-5 years	6-11 years	12-17 years	18-64 years	65+ years
1. Cardiovascular disease	0.0	0.0	0.4	3.4	89.3
2. Pneumonia and Influenza	2.07	1.2	0.4	2.0	25.4
3. Cerebrovascular disease	0.0	0.0	0.4	2.9	54.5
4. Intestinal Infection	18.5	2.7	0.4	1.5	8.0
5. Malignant Tumors of the Digestive Tract	0.3	0.0	0.0	1.7	34.1
6. COPD	1.6	0.0	0.0	0.4	29.0
7. Nutritional Deficiencies	6.6	1.2	0.0	0.8	11.8
8. Vehicle Transport Accidents	13.1	0.6	2.2	2.1	5.8
9. Tuberculosis	0.0	0.0	0.0	3.1	5.1
10. Senility	0.0	0.0	0.0	0.0	21.7

Source: Inec Mortality Censos 1991-1999, SIISE Population Censos 1990.

RESULTS

Cardiovascular disease was the leading cause of mortality. The second and third leading causes of mortality were pneumonia and influenza, respectively. Other leading causes of death included cerebrovascular disease, intestinal infections, malignant tumors of the digestive tract, COPD, nutritional deficiencies, motor vehicle crashes, tuberculosis and senility.

According to the table of mortality rates due to the most important causes of death by age group, it is obvious that individuals over the age of 65 have a significantly greater risk of dying from both cardiovascular and cerebrovascular disease than any other age group, with mortality rates of 89.3 and 64.5 per 1,000 population, respectively. Mortality rates due to intestinal infections is high among individuals 0 to 5 years of age.

The proportionate mortality according to gender demonstrates that the percent of men (51%) and women (49%) who died from cardiovascular disease is nearly equivalent. On the other hand, the mortality rate due to cardiovascular disease among men increased from 0.6 deaths per 1,000 population to 1.8 from the period of 1991-1999.

DISCUSSION

Our findings suggest that chronic diseases are increasing among residents in countries, like Ecuador, that are undergoing a demographic transition.

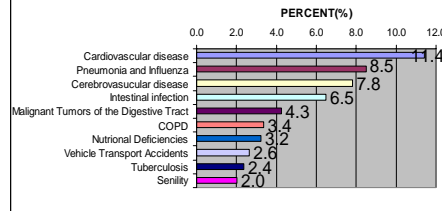
Cardiovascular disease is a major public health issue for Pedro Moncayo County, killing more people in each of the parishes compared to the other main causes of death in the county. Early in the century, cardiovascular risk factors were identified as age, male, gender, and hypertension.

Residents of Pedro Moncayo country live principally in rural areas; their major income comes from flower plantations, and there is a lack in the availability of and access to efficient health resources and coverage. All of these conditions has the possibility of creating an environment that predisposes these individuals to various chronic diseases, eventually resulting in death.

RECOMMENDATIONS

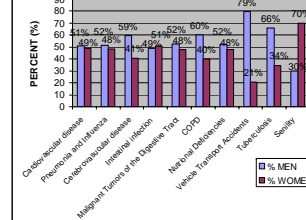
Health promotion and disease prevention activities in these settings will require increased emphasis on reducing exposures to environmental toxin and improving lifestyle characteristics of populations.

PROPORTIONAL MORTALITY OF THE MOST IMPORTANT CAUSE OF DEATH IN PEDRO MONCAYO, 1991-1999



Source: Inec Mortality Censos 1991-1999.

PROPORTIONAL MORTALITY OF THE MOST IMPORTANT CAUSES OF DEATH BY SEX IN PEDRO MONCAYO, 1991-1999



Source: Inec Mortality Censos 1991-1999.



This research was conducted in association with the Multidisciplinary International Research Training (MIRT) Program. This work was supported by a grant from the Fogarty International Center, National Institutes of Health to the University of Washington.

Disparities in Maternal Health and Utilization of Health Services among Women Residing in Pedro Moncayo County, Ecuador July-August 2002

Ursula Lang, Jose Suarez MD PhD MPH, MIRT Program, University of Washington, Seattle, WA and Fundación CIMAS del Ecuador

Introduction

It is estimated, that around 500,000 women die every year from pregnancy-related causes, 99% of those deaths occurring in the developing world.



Maternal deaths and maternal morbidity are the leading factors in ill health for women ages 15-49

Pedro Moncayo has been identified as having one of the highest infant mortality rates in Ecuador

Pedro Moncayo County serves as a model system for identifying the major epidemiological factors that contribute to maternal health and their use of health services.

Once these major risk factors are identified, the information will help local community leaders to address the immediate needs of their community.

Materials and methods

Questions related to maternal health from a 2001 cross-sectional survey conducted by Multidisciplinary International Research Training (MIRT) fellows were analyzed using SPSS.

• A total of 49 communities, 8-10 families per community and a total of 570 women were surveyed, 23% of the whole population.

• Population distributed throughout the five parishes: Tabacundo, La Esperanza, Malchinguí, Tocachi, and Tupigachi.

Variables used in Study

- Number of pregnancies
- Number of miscarriages
- Number of live births
- Number of children alive at time of survey
- Were they pregnant at time of survey?
- Length of pregnancy
- Do they use a method of birth control?
- PAP exam within the last year
- Complications
- Where they receive pre-natal attention and give birth
- Number of checkups

Results

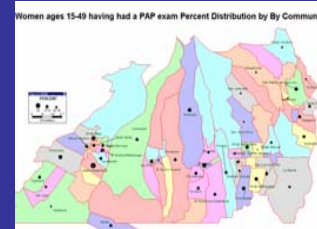


Fig. 1. Map of Pedro Moncayo County separated by community. Percentage of women having PAP exams.

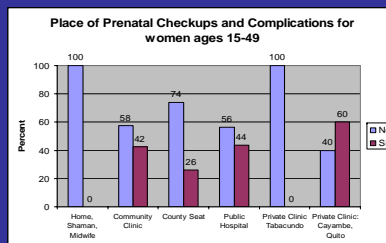


Fig. 2. Place of Prenatal Checkups and Complications for Women Ages 15-49

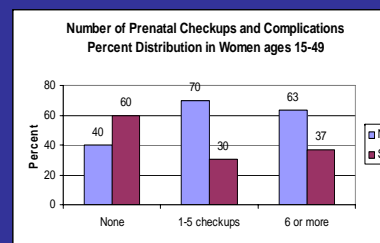


Fig. 3. Number of Prenatal Checkups and Complications: Percent Distribution in Women Ages 15-49

Variable	Tabacundo	Esperanza	Malchinguí	Tocachi	Tupigachi
% checkup			highest		lowest
% complications		highest		lowest	
% pregnant women			highest		lowest
% birth control		highest			lowest
% PAP			lowest	highest	lowest
% Public Hospital		lowest			lowest

Fig. 4. Summary of some of the most important variables in this study. The highest percentage in each parish for each variable as well as the lowest are of most importance for further analysis.

Conclusions

According to the variables used in this study, Tupigachi was found to have the highest risk for maternal health. The area also has the highest percent of indigenous people in the county. Cultural beliefs as well as physical and economic barriers are likely to be factors affecting the health status and health services utilization patterns of women in PMC. There is a significant number of women travelling several kilometers outside their county to attend public hospitals in Cayambe, Otavalo, and Quito. Only 1% attend their own county clinic. The results also show that the highest percentage of complications occur in women who give birth in public hospitals. Many women will only go to the hospital if there appears to be complications at home. The hospitals are a last resort for many women living in Tupigachi due to their reliance, first, on traditional medicine practices.

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For further information

Please contact urklang@u.washington.edu. More information on this and related projects can be obtained at <http://www.cimas.edu.ec/index2.html>



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