

# Analysis of ageing in rural communities: demographic aspects, dietary habits and inheritance of longevity

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## Abstract

**At the end of the XX - beginning of the XXI century, population ageing is the most important demographic phenomenon in economically advanced societies. Mountain communities, whose index of old age is often higher than the national average, are good samples in which to evaluate the effects of various factors on ageing processes. Here we analysed the evolution of the demographic structure during the last 50 years in four mountain communities: Alpette, Chiomonte, Novalesa and Vermiglio. We interviewed 107 people over 70 years of age, asking them questions about their dietary habits, lifestyle, health status and ancestry in order to construct genealogies.**

**The results of the study highlighted differences in the evolution of the demographic structure and ageing of the four communities, as well as some affinities, such as maintenance of the traditional dietary practices.**

## Introduction

At the end of the XX - beginning of the XXI century, population ageing is the most important demographic phenomenon in economically advanced societies. Many factors have contributed to the increased life-span, including improved economic and health conditions, environmental aspects and the genetic component (Golini et al., 1994).

In Italy, the index of old age, defined as the ratio between people older than 65 and those younger than 15, is 137.8 (ISTAT data for 1 January 2004). In some regions, particularly rural communities, the index of old age is much higher than the national average.

Because of their environmental and demographic characteristics, mountain populations are good samples in which to evaluate the effects of various factors on ageing processes and health status (Boetsch et al., 1996a; Boetsch et al., 1996b). Such populations have become internally homogeneous due to high degrees of endogamy and geographical isolation. However, they now risk losing their peculiar genetic characteristics because of the rapid development of communication routes (and thus the break-up of isolates) and depopulation (Boetsch et al., 1996a; Boetsch et al., 1996b; Lucchetti, 1982; Martuzzi et al., 1989).

For this reason, we conducted a study in four mountain communities: Alpette, Chiomonte, Novalesa (in the Western Alps), and Vermiglio (in the Eastern Alps). Alpette, Chiomonte and Novalesa are in the province of Turin. Alpette (1,000 m a.s.l.) is at the entrance of the Orco and Soana Valleys in the Canavese region; Chiomonte (750 m a.s.l.) is the town situated most downstream in the mountain complex of the Upper Susa Valley; Novalesa (828 m a.s.l.) is in Val Cenischia at the foot of Colle del Moncenisio; Vermiglio (1261 m a.s.l.) is on the left side of Val Vermiglio in the upper Valle Sole in western Trentino.

## Materials and methods

In all four communities, we analysed the demographic trend and the evolution of ageing in the last 50 years through analyses of age pyramids and the index of old age.

A comparison of age pyramids at different times can highlight the transformation of populations, as reflected in changes in the different age classes. Historical analyses have indicated that poorly evolved populations are represented by pyramidal structures. These structures tend to assume tower-like shapes when the population undergoes socio-economic evolution followed by an increase of the mean life-span, and thus an increase of elderly people (Gilli et al., 1989). In small rural towns, this is associated with a strong decrease of births and an exodus of young adults, which leave a community consisting almost exclusively of elderly individuals. This process is quite evident if we analyse the evolution of populations in the last 50 years.

The total and per sex indexes of old age provide further indications about the evolution of ageing of populations.

Although coarse, the index of old age is very dynamic, since population ageing involves a contemporaneous decrease of young people and increase of the elderly; hence, the numerator and denominator vary in opposite directions (Livi Bacci, 1999).

We also assessed the dietary practices in the four communities by interviewing 107 people who were over 70 years old and natives of the towns to at least two generations, i.e. parents and grandfathers. The questions regarded their dietary practices, lifestyle and health status.

The aim of the investigation was to identify elements of innovation, continuity or fragmentation of the dietary habits of the interviewed subjects and to ascertain if there was a correlation between diet and pathologies. Indeed, the importance of a correct diet has been emphasized in recent years, especially in relation to health status and longevity. Finally, to analyse the genetic component of ageing processes and to evaluate the possible existence of inheritance of longevity, we constructed several genealogical trees based on the interview responses.

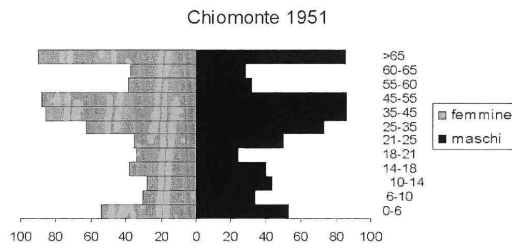


Fig. 1

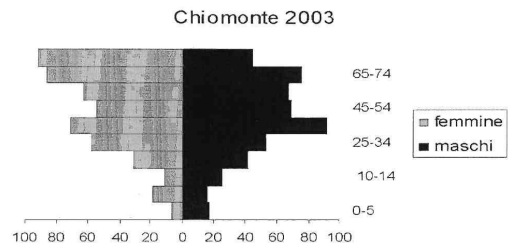


Fig. 1a

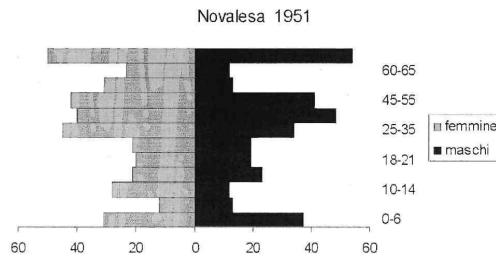


Fig. 2

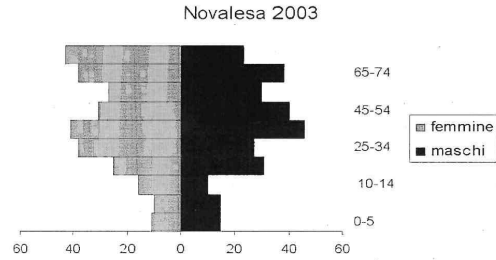


Fig. 2a

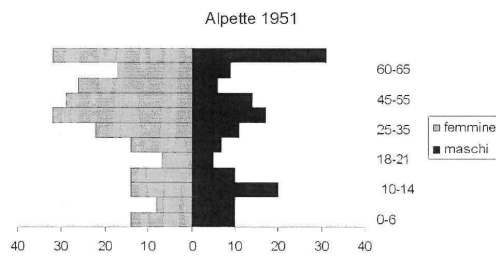


Fig. 3

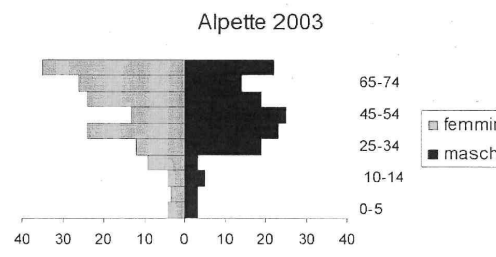


Fig. 3a

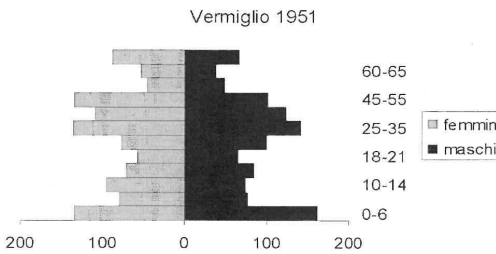


Fig. 4

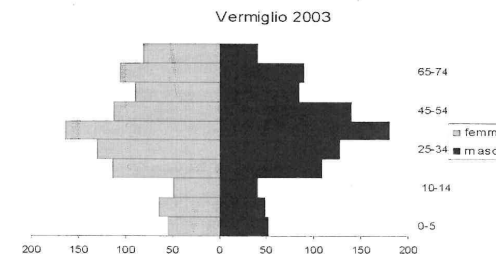


Fig. 4a

## Results and discussion

Analysis of the demographic trends revealed a strong progressive population decline in the communities of the Western Alps starting from the beginning of the XX century. At Vermiglio, however, the population increased at the beginning of the XIX century and showed no particularly evident variations thereafter.

Our discussion of the age pyramid analysis is based on comparisons of the 1951 and 2003 pyramids (Fig. 1, 1a, 2, 2a, 3, 3a, 4 and 4a). Chiomonte and Alpette showed strong ageing of the population; in fact, the 2003 pyramids were completely reversed with respect to the earlier ones. At Novalesa, there was mainly a decrease of young people from 1951 to 2003. At Vermiglio, the classic pyramid of 1961 (with wide base and pointed vertex) changed to an almost rectangular shape in 2003.

A progressive increase of elderly people, especially females, occurred in all four communities. The indexes of old age of the three communities in the Western Alps were higher than the overall Italian index (137,8); the difference was highly significant for Chiomonte (317,02), Novalesa (184,4) and Alpette (440,90), which also presented a much higher index of old age than the Piedmont region (177,5) and the province of Turin (166,4). In contrast, the index of old age of Vermiglio (102,3) was significantly lower than the Italian one but not significantly different from those of the Trentino region (105,9) and the province of Trento (120,5).

Analysis of the diet showed that almost all the people interviewed in the four towns had not lost the traditional Alpine dietary habits. They preferred genuine and seasonal foodstuffs, and maintained their traditional Alpine culinary culture. Nevertheless, they were not closed to or distrustful of innovation. Evaluating the calories and nutritional components consumed in a "typical day", we estimated that the dietary intake of the elderly subjects was 1776 Kcal and we did not find any nutritional deficiencies. Since the recommended daily intake of nutrients for an elderly person is 1800 Kcal, we can conclude that the diet of our subjects was correct and balanced and the lifestyle was suitable for their age. Since diet plays an important role in the development of cardiovascular diseases and their associated risk factors, i.e. hypertension and hypercholesterolemia, we investigated the frequency of these conditions in the interviewed subjects.

The maximum percentage of people with cardiovascular disease in the mountain communities of Piedmont was 13%. The percentage was higher at Vermiglio (25%), perhaps due to the higher consumption of animal fats. With regard to the risk factors, the percentage of hypertensive individuals was particularly high at Novalesa (50% of the sample). None of the subjects from Alpette reported a serious cardiovascular pathology. No metabolic pathologies were reported in any of the groups. Finally, reconstruction of the genealogical trees revealed

that the subjects' parents and grandparents (or at least the paternal or maternal branch), were over 75 years when they died, demonstrating a certain inheritance of longevity.

## Conclusions

This study highlighted differences in the evolution of the demographic structure and ageing of the four mountain communities. Vermiglio had a significantly lower index of old age than the other communities, which instead showed a progressive abandonment of the mountain; this emigration was presumably due to growth of the tourist industry, which attracted many young people.

However, some affinities emerged from the study, such as maintenance of the traditional dietary practices of each community. The conservation of traditions, including dietary ones, can help to narrate a community's history and to maintain memories of the past. Almost all the interviewed subjects attempted to maintain their local culinary habits, even though they had introduced elements into their daily diet that were rarely used in the past, e.g. olive oil. They also stated that they were always very sensitive and careful about what they ate; in fact, no nutritional deficiencies were recorded.

With regard to the correlation between diet and pathologies, the highest frequency of serious cardiovascular diseases was found at Vermiglio, where the use of animal fats was greatest. Finally, analysis of the genealogical trees showed that the age at death of the ancestors usually exceeded 75 years, demonstrating a certain inheritance of longevity.

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