Deconstructing Colonial Health Differentials: Malta and Gibraltar prior to World War II*

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Abstract

This paper illustrates that based on key demographic measures of well-being, Malta lagged significantly behind that of Gibraltar prior to WW II. The majority of the observed differences can be attributed to substantially higher mortality rates in both infancy and children aged 1 to 5 years of age. Clear differences existed within Malta by residence location. The observed heterogeneity in childhood mortality showed two divergent trends with an improvement among urban dwellers and decline in survivorship among rural inhabitants. Factors responsible for the differences in well being at both the inter- and intra-population level are explored.

Introduction

Historically, Gibraltar and Malta have shared a number of commonalities that would ostensibly have placed the two localities on an even footing in terms of community health. These shared attributes included:

> (1) a Mediterranean climate with characteristic prolonged periods of drought during the hot summer months, (2) within the urban landscape a highly overcrowded population with a significant proportion of the population living in extreme poverty, (3) long-term residence within a garrison setting and its associated fortress mentality, (4) an economic dependence of the civilian population on activities of the military and naval populations and commercial activities that were directly related to the strategic positioning of these colonies (e.g., the dockyards), (5) a persistent and ingrained patronage system that provided for some 'special privileges' of employment, housing and other amenities, and (6) a prevailing and deeply entrenched hierarchical class structure with British administrators at the top, and the population is predominantly Roman Catholic.[1]

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The objective of this paper is to explore in detail how and why the two 'sister' colonies differed in their health prior to WWII.

Health and Inter-Colonial Comparisons: Limiting Factors

On the broad issue of colonial health in the British Empire, there is a large and growing body of literature.[2] In contrast, there has been little comparative research of Malta relative to other colonial settings even within the Mediterranean, although there has been a substantial body of research conducted on the health status and the medical history of the Maltese people.[3] The lack of comparative information is related to a number of factors. Arguably, the most important criteria necessary for inter-population comparisons is the fundamental requirement that compulsory registration system of vital information has been established and it of a high quality. The resultant published statistical data must be readily available and consistent in content over time. Under the first requirement, health information prior to WWII is not always readily available therefore limiting the temporal scope of any potential comparative study. For example, the Medical Officer of Health in Cyprus commented in the first Annual Health Report,

> I regret to state the report is incomplete … It is almost impossible to give details of cause of death as the number of medical practitioners in the island is still limited to insist upon a death certificate in every case. In the absence of registers, it is difficult to attain {any degree of} accuracy." [4]

It was not until 1914 that systematic record reporting of health statistics became available for Cyprus. When empirical information is available the data available must still be consistent in its descriptive categorical content. For example, a longitudinal study of sex-specific mortality differentials in Malta is simply not possible prior to 1911 as the published returns that differentiate between male and female mortality do not begin until after 1910. These are but two of the significant factors that have inhibited comparisons of colonial health across time and space.

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[1] L.A. Sawchuk and S.D.A. Burke, *Reverberations of Colonialism: 20th Century Health in Malta and Gibraltar. The European Mind*, vol.1, Part 1, 2007, 105.
[2] See for example, M.Lang, 'The State of Health in the British Empire: Colonial Legacies and Health in the Third World': http://allacademic.com//meta/p_mla_apa_research_citation/1/0/9/9/7/pages109975/p109975-1.php 2008, as one of the more recent thought provoking articles.
[3] For example: J. Morana, *An Investigation on Infant Mortality in Malta*, Malta, 1946 (pamphlet located in the University of Malta library); P. Cassar, *Medical History of Malta*, London, 1965; C. Savona Ventura, *Outlines of Maltese Medical History,* Malta, 1997.
[4] *Annual Medical Report of Cyprus, 1913*, 2.

Assessing Overall Community Health

What comparative literature does exist suggests that the two communities were dramatically different prior to World War II.[5] The following research builds on these studies and exploits a novel and rigorous research strategy that incorporates sophisticated methodological tools to deconstruct the precise location of existing health differentials.

While life table methodology has been traditionally used to gauge the health of nation states, there has been growing interest in the analysis of smaller demographic units (such as cities or counties) to explore the degree of heterogeneity within a given population. This shift in focus has been accompanied with the recognition that any results must be situated within a statistical framework owing to the fact that as the size of the study unit diminishes the level of confidence in any life table estimate also falls. To address this problem scholars have employed the Chiang life table methodology as it incorporates an estimate of the standard error of both the life expectancy at birth and the probability of death at a given age. The Chiang approach to estimating life expectancy has a number of additional important advantages as: (1) it provides estimates of variance, (2) it produces the most conservative estimates for comparison between local areas, (3) it allows for sensitivity analysis to be performed on the major assumptions, and (4) it is frequently used by others in the scientific community, such as the W.H.O., and thereby allowing for comparability at the global level.[6]

Once two or more estimates of life expectancy have been generated it is important to account for the point of origin where these differences have occurred. The methodology used to accomplish this objective is decomposition methodology. There are several methods for decomposing or deconstructing differences in life expectancy, the method employed here is the origin-decomposition and destination-decomposition approach of Carlson (2006) [7] following the original work of Andreev (1982). The method is calculated directly from the life table functions: l_x, the number of survivors to age x, based on predetermined radix; L_x , the number of person years lived in a particular age segment; and e_x, the life expectancy of person years to be lived by population at age x. The end result is Andreev's ${}_n\varepsilon_x$ age decomposition value which assigns the differences in life expectancy according to the age group where the mortality difference first occurs. In other words, the goal is to pinpoint the age groups where changes in life expectancy originate. The merits of this decomposition method are grounded in the fact that it: (1)

[5] L.A. Sawchuk and S.D. Burke, "Health, Disease and the Colonial Experience: Malta and Gibraltar." A paper presented at the Annual Meetings of the Canada Association of Physical Anthropology, Peterborough, Ontario, 2006; L.Walz and L.A. Sawchuk "Malta: A Giant Step Behind the Epidemiological Transition." Paper presented at the Annual Meeting of the Canadian Association of Physical Anthropology, Peterborough, Ontario, 2006; L. Walz, Malta, "Motherhood and infant Mortality: Integrating Biological and Socio-Cultural Insight", Ph.D doctoral thesis, Department of Anthropology, University of Toronto, 2007.

[6] A.G. Manuel, V.Goel and I. Williams, "The Derivation of life tables for local areas", *Chronic Diseases in Canada*, vol. 19, no.2, 1998, 1-8.

[7] E. Carlson, "Age of origin and destination for a difference in life expectancy", *Demographic Research,* 14, 2006, 217-236.

requires only data on deaths and the population at risk (2) can be easily computed, (3) identifies the age segments having the greatest influence on life expectancy; (4) provides a quantitative measure that can be easily interpreted; and finally (5) permits a detailed description of the mortality patterns and the relative importance of different age intervals on life expectancy. In addition, the researcher can exploit another feature of the method by focusing on the destination ages where a difference in life expectancy is lived. As Carlson[8] has pointed out the elegance of the approach derives from the fact that "the two approaches are orthogonally related to each other, and derives as a origin-destination matrix, in which summing in one direction produces Andreev's origin-decomposition results, while summing in the other direction produces destination-decomposition corresponding to directly-observed differences in ${}_nL_x$ values".

Results

Table 1 shows that Gibraltarians enjoyed a significant advantage over their Maltese counterparts during the study period of 1929 to 1933. The difference among males was a 15 year advantage favouring the Gibraltarians with a life expectancy at birth of 49.3 years. Among women, the differential was even larger with an advantage of 23 years at birth for Gibraltarians. In both cases, the magnitude of the difference proved to statistically significant.

The results presented in Table 2 show that the large differentials of 15 and 23 years respectively in life expectancy between Malta and Gibraltar fell largely in two age brackets that corresponded to deaths under five years (see Figure 1). The exception to this pattern can be seen among the males ranging in age from 25 upwards. The survivorship advantage enjoyed by the Maltese males can be attributed largely to the lower rates of deaths attributable to pulmonary tuberculosis relative to their Gibraltarian counterparts. Maltese medical authorities were well aware of their favourable position reporting that that "our tuberculosis mortality compares well with that of other countries." Respiratory tuberculosis flourished in Gibraltar with its excessive overcrowding and remained a health problem until well after World War II (see Figure 2). In 1945, the Medical Officer in Gibraltar commented on the state of pulmonary tuberculosis by stating,

> The problem of tuberculosis is likely to become a major importance during the next few years. Gibraltar is both physically and to a large extent racially one of the most heavily infected areas of Europe. It has since the repatriation of the population suffered from serious overcrowding for the effective service for the prevention of tuberculosis has been lacking.[9]

[8] Ibid., 217.
[9] *Annual Medical Report, Government of Gibraltar, 1945.*

Table 1. Estimates of Life Expectancy at Birth for Gibraltar and Malta: 1929 to 1933

	Male		Female	
	Life Expectancy at Birth	Standard Error	Life Expectancy at Birth	Standard Error
Gibraltar	49.29	0.80	59.04	0.93
Malta	33.91	0.35	35.91	0.37
Difference	15.38		23.46	
Z score	17.91***		23.10***	

The census of 1931 for both locales was used as the population at risk in the computation of the respective life tables. Maltese mortality data was drawn from published reports while data on Gibraltar drawn from nominal death registry to ensure comparability of age categories.

*** denotes a significant difference at the 0.001 level

Table 2. Decomposition of Age at Origin Difference in Life Expectancy between Gibraltar and Malta: 1929 to 1933.

	Absolute Difference in Years		Relative percentage Differences	
Age	Males	Females	Male	Female
Under 1	10.18	9.59	66.16	41.44
1-4.9	11.25	12.47	73.13	53.92
5-9	-0.08	0.05	-0.50	0.20
10-14	0.04	0.00	0.26	0.00
15-19	-0.01	-0.11	-0.09	-0.46
20-24	-0.38	0.08	-2.49	0.33
25-34	-1.02	0.08	-6.63	0.36
35-44	-1.19	0.26	-7.77	1.12
45-54	-1.53	0.04	-9.92	0.18
55-64	-1.04	0.16	-6.73	0.69
65-74	-0.83	0.28	-5.36	1.23
75-84	0.00	0.19	-0.01	0.83
85 plus	-0.01	0.03	-0.04	0.14
Total difference	15.38	23.13		

Figure 1

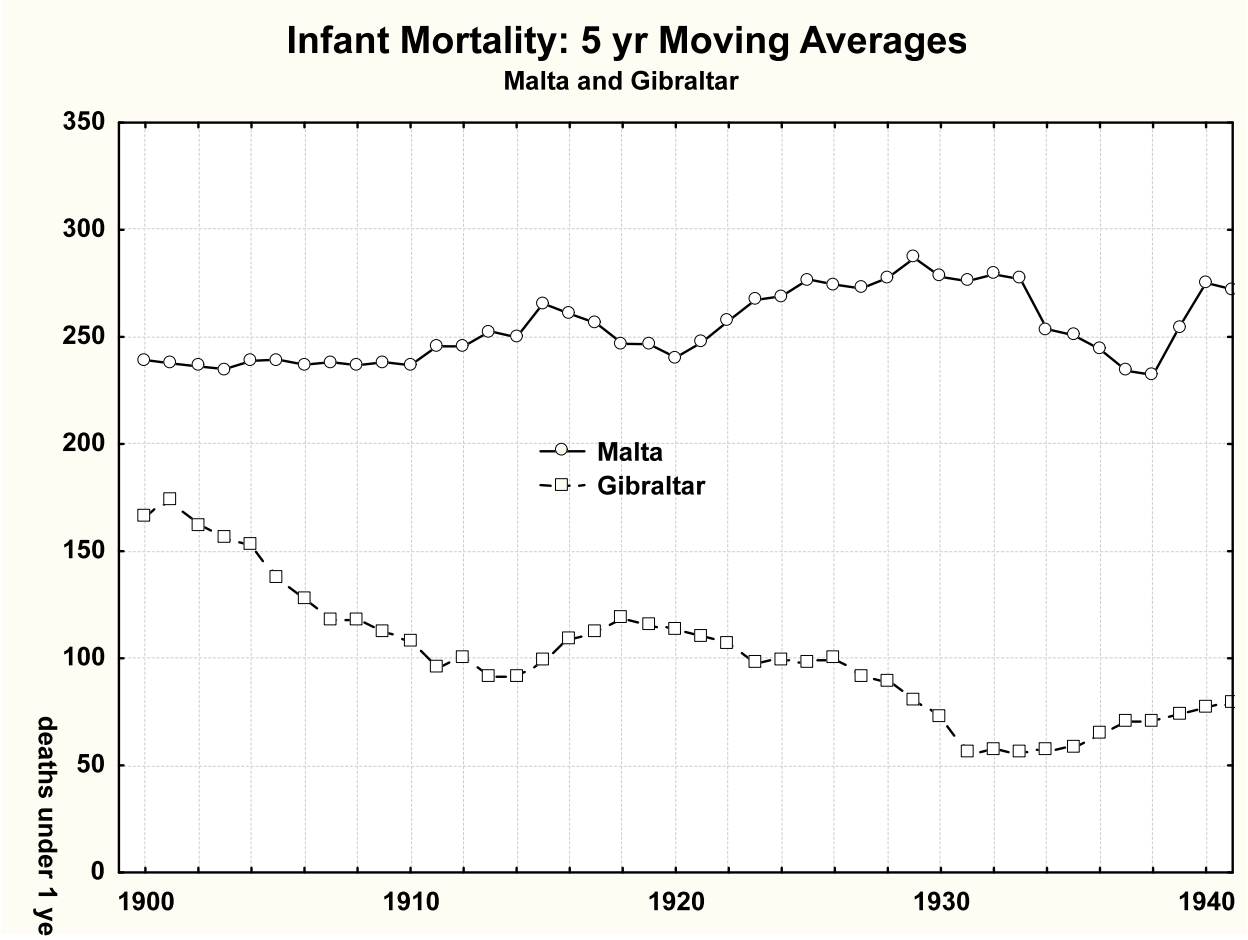
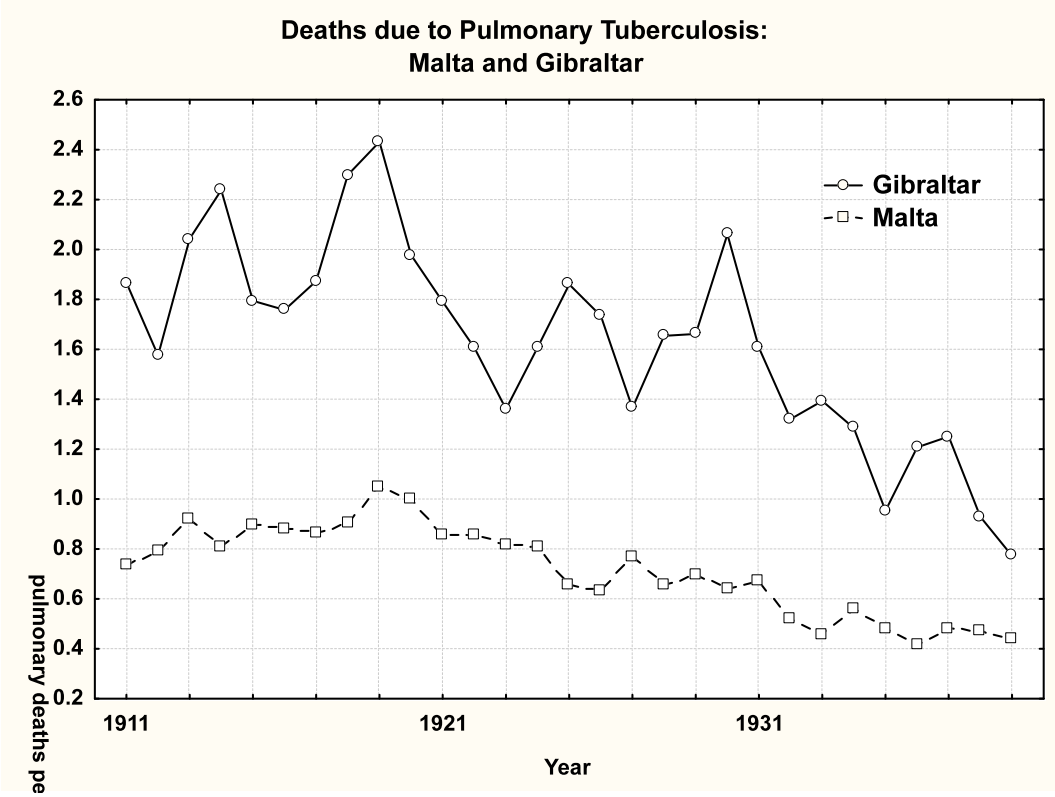

Infant Mortality: 5 yr Moving Averages
Malta and Gibraltar
350
300
250
200
150
100
50
0
deaths under 1 ye
Malta
Gibraltar
1900
1910
1920
1930
1940

Figure 2



Heterogeneity in Early Childhood Mortality in Malta

Given that the major source of the health disparity between the two colonies resided in the age band: under one year and one to 5 years of age. An initial examination of infant deaths in Malta and Gibraltar shown in Figure 1 revealed a long standing differential. To gain further insight into infant and childhood mortality in the Maltese islands across three spatial settings was undertaken.

Table 3 shows that the disparity across the different landscapes was statistically significant ($F = 17.29$, 2df, $p = .000$). It is noteworthy, that among the urban and suburban communities, infant mortality rates remained relatively stable over the study period (1900 to 1939), while there was a progressive and significant rise infant mortality in the rural communities over time ($F = 16.0$, 3df, $p = .000$). Given the large number of individuals residing in the rural communities, this pattern contributed to the maintenance of overall high infant mortality in Malta. An examination of cause-specific mortality rates

reveals that a very large proportion of the infant and childhood deaths can be attributed to deaths due to the water and food-borne infectious diseases; specifically, gastro-enteritis and diarrhea.

Table 3. The Infant Mortality Rates by Region in Malta over Time.

	Mean and Standard Deviation		
	Urban	Suburban	Rural
1900-09	228.2 +/- 51.6	269.4 +/- 57.3	254.7 +/- 83.5
1910-19	213.4 +/- 48.9	274.8 +/- 56.2	281.8 +/- 105.2
1920-29	204.3 +/- 45.4	267.3 +/- 57.7	319.0 +/- 114.1
1930-39	207.7 +/- 76.7	251.1 +/- 68.3	330.0 +/- 103.8
Average	220.6	262.7	287.7

Data taken from the respective Annual Medical Reports of Malta covering the period from 1900 to 1939.

Childhood mortality varied across the three spatial locations with an increasing rate gradient across the urban- rural continuum. Further inspection of the results presented in Table 3 revealed a heterogeneous temporal pattern with: (1) a decreasing death rate among urban centers, (2) a stable pattern among suburban communities and (3) an increasing childhood mortality rate among the rural communities. A potential confounding influence was that the published data did not allow for decomposing the influence of infant deaths in the pattern described in Table 4.

Table 4. Childhood Mortality by Region in Malta over Time

	Mean and Standard Deviation		
	Urban	Suburban	Rural
1910-19	80.3 +/- 18.7	105.8 +/- 27.4	107.4 +/- 43.3
1920-29	77.3 +/- 20.3	100.6 +/- 25.4	124.3 +/- 50.9
1930-39	62.4 +/- 20.3	92.8 +/- 31.7	122.8 +/- 46.4
Average	71.9 +/- 20.3	99.8 +/- 28.4	118.6 +/- 47.8
F ratio	8.24 p = 0.00	F = 3.03 ns	F = 5.90 p = 0.03

Deconstructing Discontinuities in Health

During the study period, Gibraltar enjoyed a significantly higher rate of survivorship than Malta (as measured in terms of life expectancy and infant mortality). Decomposition methodology used for the first time in a comparison of life expectancy for the 'sister' colonies revealed that the majority of the observed differences were localized in the age brackets (1 to 4). At the older age categories, Gibraltarians suffered higher rates of pulmonary tuberculosis than their Maltese counterparts. Within the Maltese Islands, the pattern of early childhood death rates displayed heterogeneity over time and residential form.

The observed differences between Malta and Gibraltar arose from a myriad of ecosocial factors that affected the health of the population.[10] Based on preliminary work of Sawchuk and Burke[11], four key areas can be identified and reiterated here. They include: (1) differences arising from scale, (2) the role of the 'principle of inseparability', (3) differences that arose from the pattern of fertility in the two locations, and finally, (4) the disproportionate contribution of rural communities to mortality rates observed childhood deaths.

1. Implications of Scale on Community Health

When comparing health differential at inter-and intra-community level, it is imperative to factor in the influence of scale: that is, how the size of the populations relative to the territorial scope can influence the well-being of its members. Residents of small-scale societies perceive themselves differently than larger nations. The cognitive mapping of both physical and psychological 'space', essential resources, and relationships to community members as well as to others is seen in different terms of reference. The intimacy and familiarity of living in a small settlement fosters greater group cohesion and solidarity than is possible in larger settlements dispersed over large areas. Unlike Malta, Gibraltar is an essentially single urban community, whereas the Maltese islands represented a diverse collection of distinct communities along a rural urban continuum of identification accompanied by marked health related infra-structural differences. The singular situation of Gibraltar was not lost on officials in case of providing health care to mothers, "Gibraltar is a small and compact community and its requirements are thus more easily dealt with than those of the larger Colonies with scattered populations".[12]

From a purely pragmatic perspective meeting the needs of several hundred thousand people spread over 316 square km presented a radically different challenge than meeting the infrastructure needs of Gibraltar's mere 25,000 inhabitants confined to a

[10] For a discussion of one model on the issue of understanding the origin of health differentials see N. Krieger, "Theories of Social Epidemiology in the 21st century: an ecosocial perspective", *International Journal of Epidemiology*, no.30, 2001, 668-677.
[11] Sawchuk and Burke, 2007.
[12] Duddurk, Governor, Letter to J. Chamberlain, Gibraltar Police Archives, Gibraltar, 1896.

space of 6.5 square km in terms of costs, technical and engineering feasibility. The impact of economy of 'large scale' penetrates even deeper into the fabric of a community when one considers the breadth of the poverty complex that lies at the very base of a large population. While both Gibraltar and Malta struggled under the weight of poverty in the early 20th century, the scale of the problem in absolute terms was much larger in Malta and accordingly, a more formidable socio-economic challenge.

2. The Principle of Inseparability

Another complementary point of divergence in the two colonies was the exaggerated influence of the military on Gibraltar's local affairs. Historically an inordinate amount of attention by the Home Office paid to improving Gibraltar's sanitary and medical infra-structure.[13] The importance of scale resurfaces here as the relative day-to-day physical contact with the military assumed a large impact on the ease of transmission of pathogens to and fro between the two communities. Given Gibraltar's limited physical size, a mere 6.5 square km (a significant portion of which was uninhabitable), and a shortage of housing, the civilian population simply could not be effectively physically separated from the military. Official recognition of the inseparability of military and civilian health or the intertwined nature of the two communities in Gibraltar contributed a plethora of public health reforms[14] emerged shortly after the cholera epidemic of 1860. To colonial officials, poor health among the civilians could ultimately jeopardize the well being of the troops and ultimately this would contribute to security of the territory itself. The issue of inseparability between the military and civilian communities existed in Malta but because of scale differences it did not carry the same weight.

3. Maternal Practices, Diet and Health

There were marked differences in health that can be attributed to differences in the reproductive behaviour of women in the two communities. As Figure 3 shows the two communities differed substantially in the crude fertility rate.[15] One consequence of the higher fertility among Maltese mothers was that the risk of nutritional deficiency was particularly common among mothers who bore their "offspring in quick succession as is very high in these Islands,…". With fewer Maltese women practicing breastfeeding, their offspring were at higher risk of being exposed to deadly pathogens carried in unhygienic water and food. The Annual Medical Report of 1921/22, addresses this issue by stating,

By far the most important among the causes of infant deaths are diarrhoeal

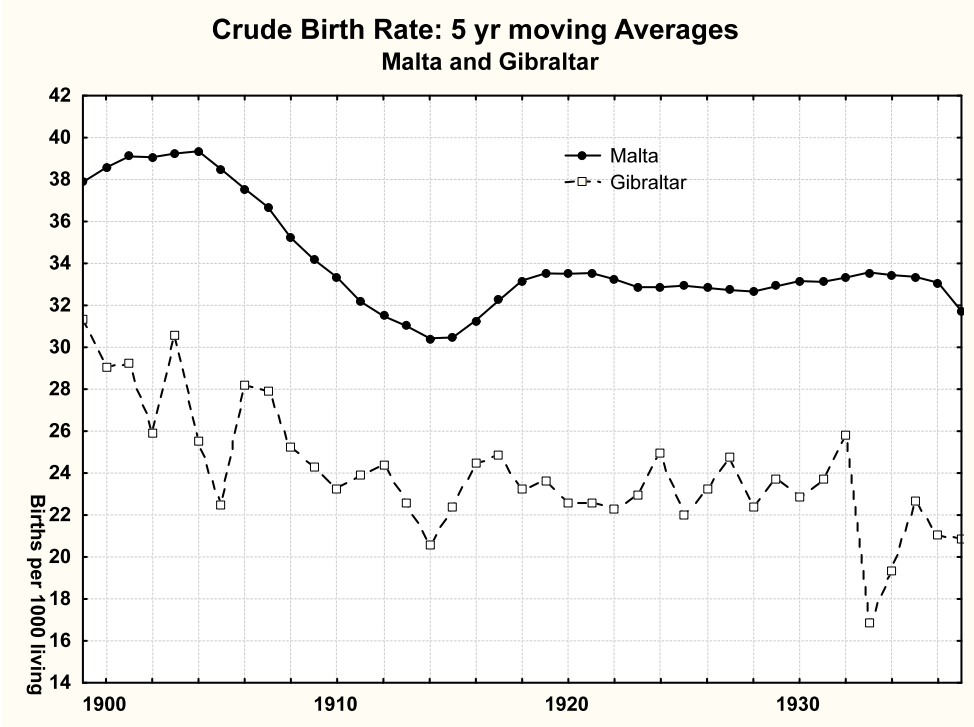
[13] L.A.Sawchuk, S.D.Burke and J. Padiak, "A Matter of Privilege: Infant mortality in the Garrison town of Gibraltar, 1870-1899", *Journal of Family History*, no.27, 2002, 399-429.
[14] L.A.Sawchuk, *Deadly Visitations in Dark Times: A Social History of Gibraltar*, Gibraltar, 2000.
[15] For a recent discussion on fertility in Malta see R.G.Milne and R.E.Wright, "The decline of Fertility in Malta: The Role of Family Planning", *European Journal of Population*, no.13, 1997, 147-167.

> diseases. In our Islands they make up roughly two-thirds of the total infant mortality. Analysis of this mortality for the last three years shows that, under this heading alone, the mortality per 1000 births has been on average one-third higher in Malta than in Gozo. One of the underlying causes of gastro-intestinal diseases in infancy is the method of feeding – breast against bottle. Happily breast feeding is still general in Gozo, and in spite of poverty and adverse sanitary and social circumstances it is proving the chief great cause of the difference in the mortality as between Malta and Gozo.[16]

As early as 1910 lectures and classes were offered to the young women of Gibraltar on child care, highlighting the importance of hygiene, breastfeeding and prevention of infant diseases.[17] By 1920, the Gibraltar Medical Officer of Health reported a continued prominence of breastfeeding among mothers: "in the great majority of cases infants have been breast-fed, and all those kept under observation have thrived." Not only did these 60 children of poor circumstances receive strict observation by the health authorities, their mother's and all new mothers in Gibraltar were trained (by doctors, nurses or recognized midwives) on the practice of breastfeeding and mothercraft. The emphasis on teaching new mothers the art of breastfeeding stemmed from the realization that it "does not come by instinct but requires to be learnt like everything else".[18] The comprehensive Gibraltarian practice of education combined with observation by trained medical professionals, showcases the prominent status of motherhood and child health within the community.

[16] *Annual Medical Report. Government of Malta, 1920*.
[17] *Annual Medical Report. Government of Gibraltar, 1910 & 1911.*
[18] *Annual Medical Report. Government of Gibraltar, 1920.*

Figure 3.



4. Urban and Rural Living: A Case of Two Solitudes

During the period 1921 to 1938, the economic structure of Malta was underdeveloped. According to Apostolidies, [19]economic growth of the Maltese depended principally on providing services for the Royal Navy. Specifically, Malta's topography with its marginal *Xaghra* soil (*karstik* land**)** and overall scarcity of productive land meant that the population of Malta was largely dependent of food imports and attracting military expenditure from the colonial ruling power for their well-being**.** The byproduct of this economic underdevelopment was that poverty was commonplace and it was especially prevalent in the rural areas.[20]

[19] A. Apostolides, "How Similar to South-Eastern Europe were the Islands of Cyprus and Malta in terms of Agricultural Output and Credit? Evidence during the Interwar Period" *MPRA Paper no.9968*, Athens, 2008, 14.
[20] See for example J. Boissevain, *Hal-Farrug: a village in Malta*, New York, 1969.

Besides the difference in wealth, the ethnos of the Maltese people can be divided by 'place'. Life in the urban and rural countryside can best be summed up as a lifestyle reflecting two, very different worlds; each of a different solitude where the people varied in language, dress, education, outlook, reproductive behaviour, personal hygiene, household amenities and the sanitary environment inside or outside the home. Collectively, the constellation of these attributes played a role in differentiating the well-being of the Maltese peoples.

For example, one description of the rural homes is most telling in this regard. Consider the statement drawn from the 1906 Annual Medical Report,

> With regards to undrained premises, mostly to be found in rural areas, night soil is generally kept and applied to the land daily or at longer intervals; waste water is thrown into the street or in "swallow holes" in the garden or other open spaces at the back of the houses. Among people of the agricultural class, the manuring value of human excreta is so highly appreciated that, even in premises provided with proper drains and cesspools, night soil is still applied to the land.[21]

While living conditions in the urban centers were abysmal, the empirical evidence presented in Table 4 suggests that there was some improvement in the childhood mortality as rates fell significantly from 80.3 to 62.4 per 1000 children under five years by end of the study period (F = 8.24, 2df, p =. .000). In the urban areas, improvements in housing and associated amenities as well as progressive developments in the sanitary infra-structure played a role in the observed decline of childhood mortality. In contrast, rural areas experienced a rise in childhood mortality from 107.4 to 122.8 per 1000 children under five years (F 5.90, 2df, p = .03).

Conclusion

This exploratory paper into the health of Gibraltar and Malta clearly establishes the fact that the populations were quite different in key demographic indicators of well-being. The most vulnerable Maltese were the young children and their mortality was shockingly high. Within the variegated Malta landscape, there is evidence to suggest that there were significant health burdens based on residential location. Life in the rural communities was fraught with poverty and a hostile environment that subjected its residents to variety of insults that challenged their well being on a day- to-day basis. Published reports of health in Malta prior to WWII consistently point out that childhood mortality in rural Malta can be attributed to a myriad of inter-related problems linked to poverty and indifference. These include: defective or non-existent house drainage, the contamination of the public and private water supply, the irrigation of vegetables with contents of cesspools, contamination of food by flies between May and November, a contaminated milk supply, ignorance of private hygiene and feeding practices, and the ubiquitous presence of nightsoil and house refuse, improper storage of food. Clearly more

[21] *Annual Medical Report. Government of Malta, 1906.*

research into the life of the rural inhabitants is paramount if scholars are to better understand 'the how and why' the health of the Maltese lagged behind that found in its 'sister' British colonial site of Gibraltar.