

Population ageing in Lebanon: current status, future prospects and implications for policy

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Abstract During the past three decades, fast declines in fertility and mortality in Lebanon have created a compressed demographic transition, a growing trend towards survival into later life, and a larger proportion of elderly people in the population. Projections show that people aged 65 years and over are expected to constitute 10.2% of the population by 2025. Nevertheless, changes to the structure and composition of the population remain unmatched by any corresponding increase in support measures either through formal channels such as pension plans or through health or socioeconomic security measures such as the provision of subsidies for health care, home help or any form of nursing care. This means that an older person is forced to be dependent upon family support if it exists. We examine demographic trends of population ageing in Lebanon between 1970 and 1995 and provide projections until 2025. Variations in population ageing within the country are also considered. We also assess health care and social policy implications of demographic changes in the context of health and economic sector reforms initiated recently by the state, and explore their impact upon the expanding population of elderly people.

Keywords Aging; Population dynamics; Health services for the aged; Health policy; Health care reform; Social security; Health surveys; Censuses; Forecasting; Socioeconomic factors; Lebanon (*source: MeSH, NLM*).

Mots clés Vieillesse; Dynamique population; Service santé personnes âgées; Politique sanitaire; Réforme domaine santé; Sécurité sociale; Enquête santé; Recensement; Prévision; Facteur socio-économique; Liban (*source: MeSH, INSERM*).

Palabras clave Envejecimiento; Dinámica de población; Servicios de salud de los ancianos; Política de salud; Reforma en atención de la salud; Seguridad social; Encuestas epidemiológicas; Censos; Predicción; Factores socioeconómicos; Líbano (*fuentes: DeCS, BIREME*).

Arabic

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Voir page 223 le résumé en français. En la página 224 figura un resumen en español.

Introduction

Population ageing is a relatively recent phenomenon, though its global manifestations — in particular the changes being experienced by developing countries — have been recognized since the first World Assembly on Ageing was convened by the United Nations in 1982. The older segment of population throughout the world is increasing both in absolute numbers and as a proportion of the total population, with 75% of older people living in developing countries (1). The unique feature of this ageing process in recent years has been its rapid pace, outstripping the skeleton social and welfare support mechanisms that have existed in some of these countries (2, 3). Given the limited resources and in particular the absence of safety nets, the ageing process in developing countries is facing far greater demands and challenges than in developed countries.

The few studies available on health status of older people in developing countries suggest that functional ageing occurs

earlier and reductions in adaptive capacity are more pronounced than in the developed world (4). The degree to which health and well-being or illness are prevalent in any one country will also depend upon a host of other factors such as the nature of the health system and access to health and social services; significant also is the social construction of health and illness, which determines utilization of health care and treatment (5). A poor state of health is also often compounded by a variety of psychosocial risk factors for isolation and lack of access to preventive and promotive health and social care (6). Inevitably, the vital contributions made by older people to both the domestic and formalized sectors are affected.

Unfortunately, the public health, social and economic implications of rapid ageing in several countries in the Eastern Mediterranean region are often not acknowledged either by policy-makers at the national level or by donor agencies at the global level, and are generally under-researched (7, 8).

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In part, this may be attributed to the traditional and rather simplistic dichotomy between developed and developing countries (9), with the assumption that ageing issues are not population challenges in the developing world. This situation is compounded by lack of a reliable database and short-sightedness on the part of policy-makers, which supports the view that extended families, as the main form of social welfare, remain intact despite decades of migration, urbanization and an increasing proportion of females entering the workforce.

In Lebanon the lack of policies for the aged has also been attributed to the long years of instability in the country from 1975 until 1991. The years of turmoil exacerbated the incomplete registration of changes to the structure and composition of the population. The most recent census, for example, dates from 1932 when Lebanon was still under the French mandate; for political reasons and because of power struggles within a society made up of 18 different religious sects, no subsequent efforts to conduct a complete census have been made. Furthermore, vital registration is not a reliable source and governmental statistical surveys were, until recently, virtually non-existent (10). Basic demographic indicators therefore rely on indirect estimates with model-based extrapolations being founded on questionable sources and small-scale, mostly non-representative studies. Consequently, population data for Lebanon published in national and international statistical reports remain largely unreliable (11), as is the case in most developing countries. For the period 1990–95, for example, life expectancy at birth (both sexes) was reported variously as 67 years (7), 69 years (12) and 75 years (13).

A brief overview of two population surveys carried out in Lebanon is given below, followed by demographic indicators of population ageing derived from two scenarios of fertility change. Variations in population ageing by persons and place within the country at the governorate level are also presented. The social and health sequelae of our findings in post-war Lebanon are then discussed.

Population surveys and projections

The Government of Lebanon, supported by the United Nations Population Fund (UNFPA), conducted a large-scale national Population and Housing Survey in 1995, which covered about 10% of the population. This survey, together with an earlier smaller-scale survey of the economically active population of the country undertaken in 1970, represented the most comprehensive effort to establish basic sociodemographic data since the census of 1932. For the first time in the country, these studies provided an opportunity to examine past and present indicators of population ageing, with projections made to 2025.

1970 survey

Data from the earlier survey conducted by the Central Directorate of the Ministry of Planning (14) provided demographic indicators as well as information on the population structure for 1970. The survey consisted of approximately 30 000 households (about one-fifteenth of the total) proportionally allocated to the capital Beirut and its suburbs, as well as 16 other cities and 169 suburban and rural smaller cities and villages.

1995 survey

Estimates for 1995 and projections until 2025 were obtained using data from the Population and Housing Survey (PHS) conducted by the Ministry of Social Affairs in Lebanon between 1994 and 1996 (15). The PHS was a national probability sample

of around 10% of the total population, covering each of the country's six governorates and 26 districts. The survey targeted all individuals of all age groups ($n = 289\ 457$) in the households sampled ($n = 61\ 580$) and data were obtained through an interview with a key informant, usually the spouse of the head of the household.

Basic demographic indicators were calculated, based on weighted data, and yielded population estimates for all Lebanon. These included total fertility rate, crude birth and death rates, life expectancy, proportion of persons over 65 years of age, male-to-female sex ratio among the elderly, dependency ratios (young, old and total) and index of ageing. In addition, an index of living arrangements among the elderly was calculated using a combination of two variables, namely marital status (married and unmarried) and household size (one, two, and three or more persons). Four categories were derived: living alone, living with spouse only, living with spouse and others, and living with non-spouse co-residents. Measures of socio-economic characteristics included education, work status and ownership of real estate.

Fertility, mortality and emigration projections until 2025

Based on the 1995 PHS data, projections were made until 2025, taking into consideration potential changes in fertility, mortality and emigration rates. Two scenarios for fertility trends were devised: high and low variant projections. The high variant assumed that the total fertility rate (2.91) as measured in the 1995 survey (16) would remain unchanged for the following ten years but start to decline in 2005 to reach near replacement level (2.1) by 2015. The low variant assumed that the current rate for fertility decline would continue unabated to reach near-replacement level by the year 2010.

With respect to mortality projections, PHS-driven life expectancy at birth for males (69 years) and females (72 years) were assumed to display, based on the West model, yearly increments of 0.20 and 0.25 years, respectively. In contrast, the crude emigration rate estimated from the PHS data (4 per 1000) was assumed to decline over time, reaching 2 per 1000 by 2005 and 1 per 1000 by 2010. All projections were made using PEOPLE software (version 2.1) (17).

Results

Table 1 presents estimates of demographic indicators of population ageing in Lebanon for the years 1970 and 1995, with 10-year projections made until 2025. Results for the period 1970–95 showed a consistent decline in all three estimates: total fertility rate, crude birth rate and crude death rate. Concurrently, the proportion of elderly population (aged ≥ 65 years) has increased from 4.9% to 7.1%. Assuming a high variant fertility decline, this proportion is expected to reach 7.8% by the year 2015 and 9.7% by the year 2025. If we were to assume faster (low variant) fertility decline, the proportion of elderly people would approach 10.2% of the total population by 2025. While young and total dependency ratios decreased markedly over the period 1970–95, they are not expected to vary significantly in the coming decades. In contrast, the old-age dependency ratio as well as the index of ageing exhibited a consistent increase.

Similarly, a lower proportion in the younger age groups and a narrowing down of the population pyramid's base were

Table 1. Trends in selected demographic indicators, Lebanon, 1970–2025

Demographic indicator	Base year		High variant			Low variant		
	1970	1995	2005	2015	2025	2005	2015	2025
Total fertility rate	4.60	2.91	2.91	2.10	2.10	2.37	2.10	2.10
Crude birth-rate per 1000	34.40	24.60	23.45	16.40	16.72	19.55	17.12	16.48
Crude death-rate per 1000	9.10	7.40	7.10	6.46	6.35	7.11	6.73	6.60
Life expectancy at birth (years)								
Male	63.10	69.00	70.50	72.50	74.50	70.50	72.50	74.50
Female	67.10	72.00	74.00	76.63	79.13	74.00	76.63	79.13
Proportion of elderly (≥65 years)	4.90	7.10	7.20	7.80	9.70	7.70	8.20	10.2
Sex ratio (≥65 years) (M/F)	1.00	0.95	0.88	0.79	0.71	0.88	0.81	0.72
Dependency ratio ^a								
Young	81.1	51.2	50.8	41.2	34.0	46.0	36.7	35.1
Old-age	9.3	11.5	12.0	12.1	14.4	12.0	12.2	15.3
Total	90.5	62.7	62.8	53.3	48.5	57.9	48.9	50.3
Index of ageing ^b	11.4	22.4	23.6	29.4	42.3	26.1	33.2	43.6

^a Dependency ratios: Young = (% of population aged ≤14 years/ % of population aged 15–64 years) x 100; Old = (% of population aged ≥65 years/ % of population aged 15–64 years) x 100; Total = Young + Old.

^b Index of ageing = (% of population aged ≥65 years/ % of population aged ≤14 years) x 100.

observed in 1995 compared with 1970, with a concomitant increase in the proportion of elderly persons. Future projections revealed wider gender gaps in survival among the elderly population, in particular in the oldest age group (>80 years) (Fig. 1).

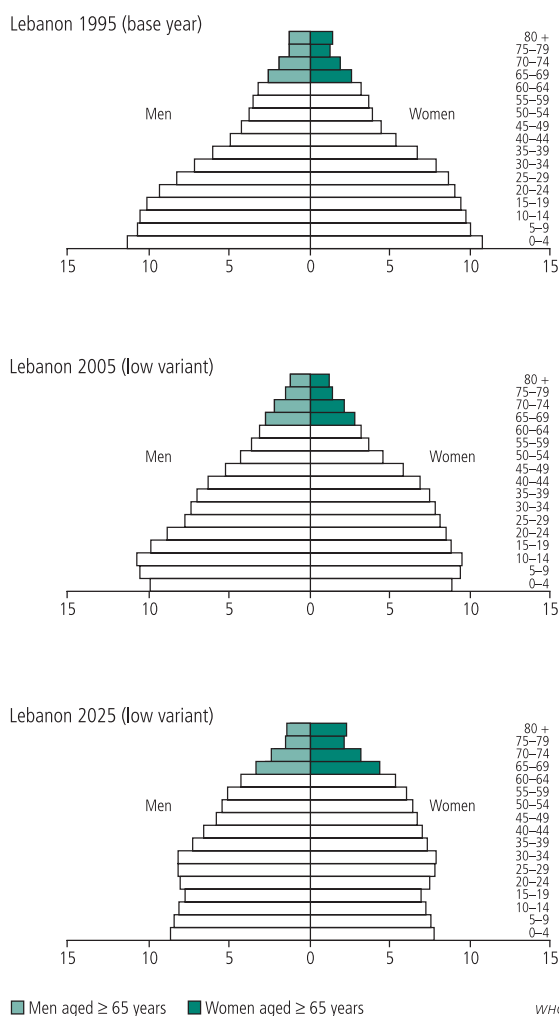
Examination of the proportion of older people in 1995 at the governorate level showed wide variations, with Beirut and Nabatieh having the highest proportion of elderly people (around 9.5%) and the largest old-age dependency ratio (around 14%) (Table 2). While elderly females outnumbered elderly males in most governorates, they were significantly more likely to be widowed or divorced (54.2% vs 12.8%, data not shown) and to be living alone (15.2% vs 4.9%). Around 65% of men were co-residing with their spouses along with other members of the household; this proportion did not exceed 27.3% among women. Compared with other governorates, Nabatieh included the highest proportion of elderly people living alone (22.1% women and 6.7% men).

Women were twice as likely to be illiterate as men, a trend that will persist in the coming few decades as younger cohorts reach older ages (Table 3). Around 40% of men reported working beyond retirement age, and an additional 22% described themselves as “not working” rather than retired. With ageing, the ratio of self-employed to employed increased and previously accumulated financial assets (in terms of ownership of real estate property) fell.

Public health and policy implications Significance of the findings

This paper presents past demographic indicators of population ageing in Lebanon, with projections for three decades from the base year 1995. The future estimates are derived from the first large database to have become available since the 1932 census and in the aftermath of 16 years of war and civil unrest in the country. Although the proportion of older people (aged ≥65 years) did not exceed 7% in 1995, projections made for the year 2025 predict levels (10%) similar to those prevailing in Europe in the 1990s (18). Older people are replacing the

Fig. 1. Age–sex structure and change in population pyramid, Lebanon, 1995–2025



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Table 2. Geographical distribution and living arrangements of elderly women and men, Lebanon, 1995

Place of residence	Elderly population (n)	% elderly in total population	Old age dependency ratio	Sex ratio among elderly M/F	Living arrangements of the elderly population							
					% of women				% of men			
					Alone	With spouse only	With spouse and others	With non-spouse co-resident(s)	Alone	With spouse only	With spouse and others	With non-spouse co-resident(s)
Governorate												
Beirut	37 550	9.4	14.0	0.91	17.4	10.4	22.0	50.2	5.8	19.4	62.9	11.9
Mount Lebanon	83 006	7.3	11.3	0.96	11.9	10.2	27.8	50.1	4.4	17.3	67.5	10.8
North	41 064	6.3	10.9	0.94	14.2	11.6	29.1	45.1	4.4	17.9	63.3	14.4
Bekaa	25 912	6.6	11.1	0.97	17.2	14.3	28.9	39.6	4.5	21.3	64.1	10.2
South	15 811	5.6	9.5	1.00	19.0	14.2	27.4	39.3	4.8	23.2	62.9	9.1
Nabatieh	16 249	9.6	13.9	0.99	22.1	16.7	30.2	30.9	6.7	23.4	59.2	10.7
Area												
Urban	178 747	7.2	11.4	0.95	15.1	11.2	26.1	47.6	5.0	19.1	64.5	11.4
Rural	40 845	6.8	12.0	0.99	15.4	14.2	32.6	37.7	4.2	19.3	64.9	11.6
Total	219 592	7.1	11.5	0.95	15.2	11.7	27.3	45.8	4.9	19.1	64.6	11.5

younger population as the main economic dependants at the household level, especially so in the absence of public welfare provision. There is also a widening gender gap in life expectancy, particularly among the most elderly: the well-known phenomenon of the “feminization” of old age has begun to reflect the situation in Lebanon.

The significance of these findings has to be considered, however, in light of the validity of assumptions made for projections in total mortality and fertility rates. The mortality pattern in Lebanon was found to be more like that in industrialized countries, with cardiovascular diseases and cancer accounting for about 60% and 15%, respectively, of underlying causes of death in older adults (19). Also, in an earlier secondary analysis of the PHS data, results show that birth rates throughout the war period continued to decline; in contrast to the baby boom that followed the Second World War in Europe and the USA, there was no evidence of a rise in fertility after the end of hostilities in Lebanon (16). Consequently, our projections are likely to be realized ahead of time and elderly dependency ratios are likely to increase. The situation is clearly compounded by several waves of migration of young male workers, depriving families of younger cohorts (20). Being in receipt of remittances is insufficient to ensure provision of the all-encompassing care that is needed in later life; in the absence of social networks and family support, such care cannot realistically be organized and supported by the state. To some extent, and by necessity, support is being provided through nongovernmental organizations, though the demand for care far exceeds supply and remains geographically very unevenly distributed. Lebanon is therefore challenged to develop policies that are affordable and tailored to meet the increasing health, social and economic needs of its growing numbers of older people.

Health care and insurance in Lebanon

Overall, the Lebanese state has played a limited role in promoting health and welfare provision. Unlike the situation in many other countries, the health sector in Lebanon is especially vulnerable

since it is largely dominated by private providers despite the public base of its finance. Driven by a free-market financing structure, the health care system in Lebanon is irrational and highly inefficient because of an extraordinary reliance on high-technology curative care and a total neglect of public health programmes, primary care and preventive services (21). Furthermore, the Ministry of Public Health continues to cover expenses for the three main curative services required in old age: kidney dialysis, open-heart surgery and cancer treatment. With the expected increase in the number of older persons, coupled with overuse of sophisticated expensive medical technologies, health expenditures associated with long-term care are likely to increase. While data from Lebanon suggest that the overall health expenditure (12.6% of GDP (corresponding to a per capita health expenditure of US\$ 500) is one of the highest in the world, there is no evidence that overall performance of the health system is commensurate (ranked 95th among 191 countries) (22).

Also, elderly people appear to be marginalized in the health policy-making process. For example, Lebanon still lacks a universal old-age pension plan and a lump sum on termination continues to be offered to employees in the private sector (23). Public insurance schemes are fragmented, with a variety of coverage modalities from multiple sources (24). While government employees and military personnel enjoy pension plans and health insurance coverage, individuals covered by the National Social Security Fund lose their health insurance upon retirement, at the very time when it is most needed. The majority of the labour force working in their own small private enterprises and casual labourers are not covered by any legislation. Furthermore, access to private insurance is costly and is not feasible for anyone with pre-existing conditions. Thus post-retirement entry into insurance schemes for health coverage remains largely prohibitive.

The dilemma of insurance coverage is further related to the fact that, as in many other countries, women’s work is concentrated in the informal sector and therefore is not counted as

Table 3. Distribution of elderly men and women (aged ≥ 65 years) by educational level, economic activity and ownership of real estate, compared with younger cohorts (40–64 years), Lebanon, 1995

	Age group			
	40–64 years		≥ 65 years	
	Men (310 245) ^a	Women (33 147)	Men (104 819)	Women (108 466)
Education level				
Illiterate	14.4	32.9	33.9	62.9
Informal or primary	42.0	35.0	49.0	27.2
Secondary	29.1	26.7	12.1	8.9
University and above	14.4	5.4		
Work status				
Working				
Self-employed	39.6	2.1	26.4	1.1
Employee	45.9	11.6	13.8	1.8
Not working (men)	7.1	85.7	22.0	94.0
housewife (women)				
Retired	7.4	0.7	37.3	3.1
Ownership of real estate				
None	7.3	7.4	49.8	55.0
Generates primary income	9.4	9.8	9.3	7.3
Generates secondary income	26.4	26.3	12.5	11.0
Does not generate income	56.9	56.5	28.5	26.7
Total	100.0	100.0	100.0	100.0

^a Figures in parentheses are number of men or women.

productive or covered by any benefits (25). We found that the majority of elderly women never worked (94%), and this is not likely to change in the near future as younger cohorts enter into old age (85.7%). Consequently, any retirement plan or health benefits linked to workforce participation would have limited value for women. Women are obliged to be totally dependent upon the income and work-related benefits of the male breadwinner or, if such an option does not exist, upon the charity of institutions and distant relatives.

Implications for policy

Our findings also suggest considerable variations in household arrangements across administrative districts, with elderly people living in Nabatieh in the south of Lebanon being at a significant disadvantage compared with those in other areas. Politically and economically this region has faced much hardship throughout the period of war. With limited access to social and economic resources, large areas were depopulated as people

lost their livelihoods and moved towards Beirut in search of work. Inevitably these migrants were younger adults leaving behind frail parents to fend for themselves, to the extent that 22% of older females were found to be living alone in this area. There are several other pockets of family-deprived older people throughout the country, because during the years of turmoil whole families of children were sent overseas. Nevertheless, Lebanon remains in the privileged position of retaining strong community-based affective ties that are often absent in advanced industrialized countries, where varied notions of community are often fragile and tenuous. The concept of social capital has only recently emerged as a neighbourhood resource for successful ageing (26, 27) and such ties need to be harnessed for policies of support before they, too, are fractured and displaced through pressure.

Lebanon is characterized by unique sociodemographic features that render the ageing of its population a complex challenge. Past and present fertility levels are among the lowest in the region, crude mortality was estimated at 9.1 per 1000 as early as 1970 (28), and noncommunicable diseases, in particular coronary heart disease, have been considered to be the leading causes of death since the 1960s (29). Yet ageing, traditionally conceptualized as an issue of concern for developed countries, has never been a priority area in Lebanon. Geriatric medicine is not included in the medical or nursing curricula of any university in the country, there is a lack of social workers specialized in gerontology, and geriatric wards are virtually absent from both public and private hospitals. Similarly, research activities continue to be geared towards the health of children, adults of working age and women of reproductive age. All these factors contribute to a lack of policies towards ageing, as well as a lack of reliable data on older people. Reforms of the health and social sectors are currently a national priority, and reliable demographic and empirical epidemiological data are imperative for evidence-based public health decision-making.

In conclusion, there is a great deal of heterogeneity among older people in Lebanon. Data aggregated at the country level hide significant internal variations and may lead to confusing appraisal of health and social policy formulation (8). Epidemiological and health-related information on the elderly population remain largely lacking. Existing data urgently need to be consolidated with future studies that convey the WHO Minimum Data Set on ageing (30), so as to assess requirements and plan social and health programmes. The implementation of the Madrid International Plan of Action on Ageing, emanating from the second World Assembly on Ageing held in 2002, require sustained action and partnership at different levels and among different stakeholders including government, civil society, academia and the private sector, as well as older persons themselves. Capitalizing on social capital and neighbourhood ties may provide a window of opportunity to compensate for the attenuated base of family support for elderly people in Lebanon. ■

Conflicts of interest: none declared.

Résumé

Le vieillissement de la population au Liban : situation actuelle, perspectives d'avenir et répercussions pour les grandes orientations

Depuis une trentaine d'années, la chute rapide de la fécondité et de la mortalité au Liban est à l'origine d'une transition démographique accélérée, d'une tendance croissante à l'allongement de la vie et

d'une augmentation de la proportion des personnes âgées dans la population. D'après les projections, les personnes de plus de 65 ans devraient représenter 10,2 % de la population en 2025. Or, face à

l'évolution de la structure et de la composition de la population, on ne note aucun développement des mesures d'appui, qu'il s'agisse de systèmes officiels comme les plans de pension ou de mesures de santé ou de sécurité socio-économique comme l'octroi de subventions pour les soins, l'aide à domicile ou les soins infirmiers. Cela signifie qu'une personne âgée dépend nécessairement de sa famille, pour autant qu'elle en ait une. Nous avons examiné ici les tendances démographiques liées au vieillissement de la

population du Liban entre 1970 et 1995 et établi des projections jusqu'en 2025. Les variations du phénomène de vieillissement à l'intérieur du pays ont également été étudiées. Nous avons examiné les répercussions de l'évolution démographique du point de vue des soins et de la politique sociale dans le contexte des réformes sanitaires et économiques récemment entreprises par les pouvoirs publics, et envisagé leurs effets sur le nombre croissant de personnes âgées.

Resumen

Envejecimiento de la población del Líbano: situación actual, perspectivas e implicaciones para las políticas

Durante los tres últimos decenios, las rápidas disminuciones de la fecundidad y la mortalidad registradas en el Líbano han dado lugar a una transición demográfica comprimida, una tendencia creciente hacia una mayor longevidad y una mayor proporción de personas ancianas en la población. Según las actuales proyecciones, las personas de más de 64 años constituirán el 10,2% de la población para 2025. No obstante, los cambios de la estructura y composición de la población siguen sin verse acompañados por aumento alguno de las medidas de apoyo necesarias, basadas ya sea en mecanismos formales como los planes de pensiones o en medidas de seguridad sanitaria o socioeconómica como la concesión de subvenciones para atención de salud, ayuda domiciliaria o cualquier modalidad

de atención de enfermería. Esto significa que las personas mayores se ven obligadas a depender del apoyo familiar en el mejor de los casos. Examinamos en este artículo las tendencias demográficas de envejecimiento de la población en el Líbano entre 1970 y 1995 y aportamos proyecciones hasta 2025. También se analizan las diferencias que se dan dentro del país en cuanto al envejecimiento de la población. Evaluamos las implicaciones de los cambios demográficos para la atención de salud y las políticas sociales en el contexto de las reformas de la salud y del sector económico iniciadas recientemente por el Estado, y estudiamos su impacto en la creciente población de personas ancianas.

Arabic

References

1. Kalache A, Aboderin I, Hoskins I. Compression of morbidity and active ageing: key priorities for public health policy in the 21st century. *Bulletin of the World Health Organization* 2002;80:243-4.
2. Cliquet R, Nizamuddin M, editors. Population ageing – *Challenges for policies and programmes in developed and developing countries*. New York: UNFPA; and Belgium: CBGS; 1999.
3. Kalache A, Sen K. Ageing in developing countries. In: Pathy MSJ, editor. *Principles and practice of geriatric medicine*. Hoboken (NY): John Wiley & Sons; 1998.
4. Zohoori N. Nutrition and health functioning in the developing world. *Journal of Nutrition* 2001;131:2429S-32S.
5. Restrepo HE, Rozental M. The social impact of aging populations: some major issues. *Social Science and Medicine* 1994;39:1323-38.
6. Imuta H, Yasumura S, Abe H, Fukao A. The prevalence and psychosocial characteristics of the frail elderly in Japan: a community-based study. *Aging* 2001;13:443-53.
7. Hafez G, Bagchi K, Badr A. Ageing populations of the Eastern Mediterranean Region: a challenge for health care systems. *Eastern Mediterranean Health Journal* 1992;6:6-15.
8. Lloyd-Sherlock P. Population ageing in developing regions: implications for health policy. *Social Science and Medicine* 2000;51:887-95.
9. Beaglehole R, Bonita R. *Public health at the crossroads. Achievements and prospects*. Cambridge: Cambridge University Press; 1999.
10. Sibai AM, Nuwayhid I, Beydoun M, Chaaya M. Inadequacies of death certification in Beirut: who is responsible? *Bulletin of the World Health Organization* 2002;80:555-61.
11. Kaufman JS, Asuzu MC, Rotimi CN, Johnson OO, Owaoje EE, Cooper RS. The absence of adult mortality data in sub-Saharan Africa: a practical solution. *Bulletin of the World Health Organization* 1997;75:389-95.
12. World Bank. *Social indicators of development 1995*. Washington (DC): World Bank; 1995. p. 194-5.
13. United Nations. *Demographic and related socioeconomic data sheets for countries of the Economic and Social Commission for Western Asia*. New York: United Nations; 1993. p. 83-92.
14. Central Statistical Office. *L'enquête par sondage sur la population active au Liban, 1970 [Survey of the economically active population in Lebanon, 1970]*. Beirut: CSO; 1972. In French.
15. UNFPA and Ministry of Social Affairs. *Population and Housing Survey*. Beirut: Ministry of Social Affairs; 1995 (raw data on CD-ROM).
16. Kulczycki A, Saxena PC. New evidence on fertility transition through wartime in Lebanon. *Genus* 1999;LV:131-52.

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17. Her Majesty's Stationery Office. *PEOPLE ver. 2.1. A user-friendly software package for making national and sub-national population projections*. British Crown copyright 1990. London: HMSO; 1990.
18. Crosby G, editor. *The European directory of older age: information and organizations concerned with older people in the 12 EC member states*. London: Centre for Policy on Ageing; Simpson Drewett & Co.; 1993.
19. Sibai AM, Fletcher A, Hills M, Campbell O. Non-communicable disease mortality rates using the verbal autopsy in a cohort of middle-aged and older populations in Beirut during wartime, 1983–93. *Journal of Epidemiology and Community Health* 2001;55:271-6.
20. Faour A. Migration from South Lebanon with a field study of forced mass migration. *Population Bulletin of ESCWA* 1981;12:27-60.
21. Ammar W. *Health system and reform in Lebanon*. Cairo: WHO Regional Office for the Eastern Mediterranean and Lebanese Ministry of Public Health; 2003.
22. Ammar W, Karam N. Health systems performance assessment. *Lebanese Medical Journal*, 2001;49:121-2.
23. Sibai AM. The elderly in Lebanon. In: *The status of disadvantaged population groups in Lebanon – Population and Housing Survey*. Beirut: Ministry of Social Affairs and UNDP; 2000. p. 48-124.
24. Ammar W, Mechbal A, Nandakumar AK. *National Household Expenditures and Utilization Survey, 1999, vol 3*. Beirut: Ministry of Public Health in collaboration with Central Administration of Statistics, World Health Organization and World Bank; 2001.
25. Sen K. Gender. In: Ebrahim S, Kalache A, editors. *The epidemiology of old age*. London: BMJ Publishing Group; 1996. p. 210-20.
26. Nyqvist F. *Social capital: interdisciplinary perspectives*. Available at: URL <http://www.ex.ac.uk/shipss/politics/research/socialcapital/abstracts/nyqvist.php> (accessed on 12 October 2003).
27. Michael Y. *Measuring social capital: A neighborhood resource for healthy aging*. Available at: URL: <http://apha.confex.com/apha/130am/techprogram/paper_46234.htm>
28. Zurayk H, Armenian H, editors. *Beirut 1984: a population and health profile*. Beirut: American University of Beirut; 1985.
29. Abou Daoud KT. Mortality and cause of death in the city of Beirut. *Lebanese Medical Journal* 1967;20:273-89.
30. Kowal P, Peachey K. *Indicators for the Minimum Data Set Project on Ageing: a critical review in sub-Saharan Africa*. Geneva: HelpAge International, WHO and United States National Institute on Ageing; 2001. WHO document WHO/EIP/GPE/01.1.