Feminization of disease and disability association in six low and middle income countries: Evidence from the Study of Global Ageing and Health

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Introduction

Disability free life is generally considered a good indicator of overall health status in older populations, and a life free from disability is a strong indicator of successful aging. Understanding the factors that are associated with disability in older persons has been deemed a critically important public health issue. As there is no direct mortality associated with the various types of disabilities, they remain at the bottom of the government's and researcher's priority list.

Across the world, people with disabilities have poorer health outcomes, lesser health care utilization, higher health risk factors, lower quality of life, more barriers in social cohesion and lower quality of life than people without disabilities. This is partly because people with disabilities experience barriers in accessing services that many of us have long taken for granted, including health, education, employment, transport, information and exclusion from everyday life activities. These difficulties are exacerbated in less advantaged communities. Following the entry into force of the United Nations *Convention on the Rights of Persons with Disabilities* (CRPD), disability is being increasingly understood as a human rights issue. Disability is also a pivotal development issue. All the targets and policies of achieving social and economic equality will not be possible to meet if the concerns of the disabled such as health care utilization, quality of life, social networking, are not addressed.

So there is an increasing recognition and emphasis on the needs and rights of people with disabilities which has resulted in a growing demand for information by the planners and policy makers involved in this field. Given the importance of the problem, it is essential that disabled persons receive researcher's attention.

Disability is an umbrella term, covering impairments, activity limitations, and participation restrictions. Disability is thus not just a health problem. It is a complex phenomenon, reflecting the interaction between features of a person's body and features of the

society in which he or she lives. Overcoming the difficulties faced by people with disabilities requires interventions to remove environmental and social barriers.

Disability is complex, dynamic, multidimensional, and contested. Over recent decades, the disabled people's movement (Charlton, 1998; Driedger, 1989) together with numerous researchers from the social and health sciences (Barnes, 1991; McConachie, et al., 2006) have identified the role of social and physical barriers in disability. The transition from an individual, medical perspective to a structural, social perspective has been described as the shift from a "medical model" to a "social model" in which people are viewed as being disabled by society rather than by their bodies (Oliver, 1990).

The medical model and the social model are often presented as dichotomous, but disability should be viewed neither as purely medical nor as purely social: persons with disabilities can often experience problems arising from their health condition (Thomas, 1999).A balanced approach is needed, giving appropriate weight to the different aspects of disability (Shakespeare, 2006; Forsyth et al., 2007).

The ICF, adopted as the conceptual framework for this *manuscript*, understands functioning and disability as a dynamic interaction between health conditions and contextual factors, both personal and environmental (ICF, 2011). Promoted as a "bio-psycho-social model", it represents a workable compromise between medical and social models. The WHO defines disability as an umbrella term for impairments, activity limitations, and participation restrictions (Wan, et al.2012).

The ICF is universal because it covers all human functioning and treats disability as a continuum rather than categorizing people with disabilities as a separate group: disability is a matter of more or less, not yes or no. However, policy-making and service delivery might require thresholds to be set for impairment severity, activity limitations, or participation restriction. It is useful for a range of purposes – research, surveillance, and reporting – related to describing and measuring health and disability, including: assessing individual functioning, goal setting, treatment, and monitoring; measuring outcomes and evaluating services; determining eligibility for welfare benefits; and developing health and disability surveys.

More than one billion people in the world live with some form of disability, of whom nearly 200 million experience considerable difficulties in functioning. Statistics suggest significant variations in the prevalence of disability across the globe. The study by World Health

Survey (WHS) reveals that among 60+ aged people, 38% of the world population is suffering from disability while this is 30% in high income countries and 43% in low income countries (WHO and World Bank, 2011). The prevalence of disability is a particular concern in developing countries. The WHO reports that 80% of persons with disabilities live in low-income nations and that most are poor (WHO 2010). The disability prevalence among people 45 years and older in low-income countries is higher than in high-income countries (WHO & World Bank 2011). More than three-fourths of the population aged 50 and over suffering from the disability in countries like China, Ghana, India, Mexico, Russia, and South Africa (Wan et al., 2012).

In India, about 26 million people were found to have a disability, who constituted about 2 percent of the population (Census 2011). SAGE study reveals that almost 90% of the population aged 50 and over had some type of disability in India (Wan, et al.2012). In Bangalore 27 per cent of the respondents had mild disability while 37 per cent had higher level of disability among 65 years and above population (Srinivasan, et al., 2010). In northern part of India, 87.5% had minimal to severe disabilities among 200 subjects aged 60 and over (Joshi, et al., 2003). Half of the elderly population in the study area of Tamil Nadu is suffering from one or the other forms of physical disability (Audinarayana & Sheela, 2002).

In China 44 million people aged 59 years or more suffering from disabilities. (Fisher, et al., 2011). And it was estimated that the prevalence of physical disabilities was 1.42% and there was an increase of 16.57 million people with physical disability for the past 20 years from 1987 to 2006 (Luan, & Liu, 2008). Activity of daily living (ADL) disability also increased from 3.9% to 7.1% during the 8 years of follow-up (1992 to 2000) among 55 years and over population of Bejing (Jiang, et al., 2002). Another study conducted in Bejing divulges that disability rate was 8% during follow-up among persons aged 55 years or more (Tian, et al 2012).

In Mexico disability prevalence of 9.6% was found to perform ADL and of 31.5% for the instrumental activities of daily living (IADL) (Arias-Merino, et al., 2012).

Association of disease and disability

Occurrence of disease and disability is highly associated. The prevalence of multiple diseases increases likelihood of developing disability, as the number of diseases increases, there is increasing risk of disability. Disease was more highly explanatory of disability than were age, race, or educational status. Studies, suggesting that specific diseases can cause specific types of disability. For Example, diabetes may increase the risk of disability (Graham et al., 2007)

because of its wide-ranging complications, including cardiovascular and peripheral vascular disease, vision loss, and peripheral neuropathy. Few studies, however, have examined the prevalence of physical disability associated with diabetes (Centers for Disease Control and Prevention, 2007). Hypertension, diabetes and depression were not associated with disability. Arthritis, hearing impairment, gastro-intestinal and respiratory diseases, and dementia increased the risk of disability significantly (Duba, et al., 2012). A bunch of studies had described the relation between disability and arthritis (Centers for Disease Control and Prevention, 2002).

Women represent a growing proportion of all older people, but added survival means increasing disability associated with chronic conditions such as cardiovascular and respiratory disease, cancer and diabetes, and functional limitations that impact on daily living. In many countries age adjusted disability prevalence rates are higher for women and those in the poorest wealth quintile. A study of gender differences in health showed that, after adjusting for age, women were more likely than men to have disabling including and functioning problems.

Many studies have reported a strong association between the increase in age and disability. So the study had focused only to population aged 50 years or more. Because of the above mentioned reasons China, Ghana, India, Mexico, Russia, and South Africa were included in the study.

Need for the Study

Very few studies had covered the broader spectrum of disability. Majority of the Studies dealing with disability had taken only certain domains of disability like activities of daily living ADL and instrumental activities of daily living IADL. ADL and IADL represent only physical aspects of disability and understanding of disability on the basis of ADL and IADL may be misleading. So this study had used a composite index of eight health and functioning domains: vision, mobility, self-care, cognition, interpersonal activities, pain and discomfort, sleep and energy, and affect. Moreover, a large number of studies had taken institutionalized population or a population of a particular community. Very fewer studies were representing the general population based on household survey. The data which was used in this study is a household survey data. Many studies had focused on the socioeconomic and demographic aspects of disability. Extant literature suggests sex differential in the prevalence disability. There is a dearth of studies which are dealing the association of disability with diseases. It is very important to understand the association of disease and disability, as it is very crucial for policy implication because, it gives

the information that which diseases are higher in pushing the persons towards disability. Moreover, there are drought of studies discussing sex differential in the association of disease and disability. Moreover none of the studies is discussing disease and disability association with gender perspective.

The disease and disability relationship have been largely described in the context of arthritis while other chronic diseases had not given much attention. Moreover, relation between comorbidity and disability has not been discussed much.

Data

The present study uses data from the Study on Global Ageing and Adult Health (SAGE) surveys implemented in six countries – China, India, Ghana, Mexico, Russia and South Africa – during 2007-2010. SAGE is a longitudinal, cross sequential, household face to face survey. The current survey is the first baseline for SAGE survey programme in selected countries.

The goals of SAGE are to promote a better understanding of the effects of ageing on well-being, examine the health status of individuals aged 50 and above years and changes, trends and pattern that occur over time, and to improve the capacity of researchers to analyze the effects of social, economic, health care and policy changes on current and future health. SAGE will improve the empirical evidence base on the health and well-being of older adults and aging in developing countries through provision of reliable, valid and cross-nationally comparable data for examining health difference across individuals, countries and regions plus providing validated health measurement methods. The aim is to provide baseline and longitudinal health and health related data on older persons in middle and low income countries.

SAGE data collection domains include self-reported assessments of health linked to anchoring vignettes for improved comparability across individuals, communities and populations; assessment of perceptions of well-being and quality of life; self-reported assessment of functioning with measured performance test on a range of different health domains; biomarkers; and introduction of a longitudinal study design to allow for dynamic examination of changes in health expectations and experience over the life course and investigation of the compression of morbidity in aging populations.

The target population in the SAGE survey is aged 18+ years, with an emphasis on population aged 50+ years. A multistage stratified clustered sample design was used uniformly in all the countries included in the SAGE. SAGE interviewed 13,158 older persons (50 years or

older) in China, 4,305 in Ghana, 6560 in India, 2,301 in Mexico 3,938 in Russia and 3836 in South Africa.

Methodology

For the purposes of the study disability score is constructed based on eight health and functioning domains: vision, mobility, self-care, cognition, interpersonal activities, pain and discomfort, sleep and energy, and affect. The questions were asked to respondent "Overall in the last 30 days, how much difficulty did you have…." in the aforementioned health and functioning domains. Self-reported response categories to these questions were: no difficulty, mild difficulty, moderate difficulty, severe difficulty, and extreme difficulty.

A summary score had been generated by using An Item Response Theory (IRT) partial credit model (PCM) to describe the prevalence of disability in the populations.

The partial-credit model (Masters 1982) is an extension of the Rasch model to polytomous items with ordered response categories $1, \ldots\ldots\ldots\ldots, 5$ for item i.

The PCM specifies the probability of responding in the jth category of item i for person n as a function of the person ability θ_n and step parameters δ_{ij} $(j > 1)$

$$\Pr(x_{in} = j|\theta_n) = \frac{\exp \sum_{l=1}^{j}(\theta_n - \delta_{il})}{\sum_{k=1}^{m_i} \exp \sum_{l=1}^{k}(\theta_n - \delta_{il})} \qquad j = 1, \ldots\ldots\ldots\ldots, 5$$

Where $\sum_{l=1}^{1}(\theta_n - \delta_{il}) = 0$. This is a special case of a multinomial logit model, namely, an adjacent category logit model (Agresti 2002) with

$$\ln \frac{\Pr(x_{in} = j|\theta_n)}{\Pr(x_{in} = j - 1|\theta_n)} = \theta_n - \delta_{ij}$$

The parameter δ_{ij} is known as the step difficulty associated with category j of item i. It represents the added difficulty when moving the step from category j -1 to category j (Embretson and Reise 2000; Wilson 2004).

A 2 parameter logit (2PL) PCM (Muraki 1992) can also be specified by including a slope parameter, λ_i, that allows each item to have a different discrimination.

In the PCM, the linear predictors v_{ijn} represent the logarithms of the numerators of the response probabilities:

$$\Pr(x_{in} = j|\theta_n) = \frac{\exp(v_{ijn})}{\sum_{k=1}^{m_i} \exp(v_{ikn})} \qquad j = 1, \ldots\ldots\ldots\ldots, 5$$

The score ranges between 0 (=no disability) and 100 (=complete disability).

Bivariate analyses, male-female difference were used to understand gender differential in the association of disease and disability.

Results

The percentage distribution of sample by selected characteristics is shown in Table 1. The proportion of the population currently not working is extremely high in sampled population of Russia and South Africa. In these two counties every second person is currently not working. The proportion of the population who never worked is highest in Mexico (38%) while it is lowest in Russia (0.4%). More than one fifth of the sampled population is widowed in four countries namely Ghana, India, Russia and South Africa. In Russia and Ghana almost 26% sampled population is widowed. Currently married population is also varying significantly across the countries. It is highest in China (85%) while it is lowest in South Africa (49%). In three countries namely Mexico, Russia and South Africa, the proportion of female population was significantly high in sampled population. This percentage was 58% in Russia followed by South Africa (56%) and Mexico (53%). The Indian sample was similar to South African sample in terms of age structure. Proportion of 70+ populations is highest in Ghana (32%) sample followed by Russian (29%) sample. This percentage was least in South Africa (19%). Higher education was more common in the Russian sample; about 57% of the respondents reported that they had level of education above high school. This percentage was around 14% in China and South Africa, and almost 10% in rest of the countries. Persons belonging to top wealth quintile are highest in Russia (28%) followed by Mexico (26%) and Ghana (24%). Rural-urban residence varied considerably across the countries. The percent urban ranged between as low as 29% in the Indian sample to as high as 79% in the Mexico sample.

In the first step the prevalence of disability among older population (aged 50 years or more) by sex in all six countries has been discussed. India has the highest prevalence of disability (56%) followed by Ghana (53%). Every second person of aged 50+ is suffering from disability in India and Ghana. Similarly prevalence of disability is also highest among females in India (65%) followed by Ghana (61%).Prevalence of disability is lowest in China (22%) followed by Mexico (35%) and Russia (37%).

In next stage the prevalence of disability among elderly with different chronic diseases by sex in all six countries has been described. In India persons suffering from asthma have highest prevalence of disability followed by depression and chronic lung disease. Sex differential in the prevalence of disability among persons who are suffering from different kind of disease are alarming. For example, among heart disease patient, the prevalence of disability among male is 58% while among female it is 83% in India. In china, the prevalence of disability is highest among persons who are suffering from heart disease (42%), while it is lowest among hypertension patient (27%). The prevalence of disability is highest among persons who are suffering from depression (83%), while it is lowest among cataract patient (60%) in South Africa. In India the differences in the prevalence of disability between male and female is highest for heart patient followed by diabetes and cataracts, while lowest difference is found for arthritis followed by asthama and depression. In China sex differential in disability is highest for depression patient while it is lowest for asthama patient. Surprisingly in Mexico and South Africa, sex differential in disability is advantageous for female for some diseases.

Discussion

Sex differential in the prevalence of disability among persons who are suffering from different kind of disease are alarming. Association of disease and disability is fully feminized, moreover; huge differences are found in the prevalence of disability among morbid persons across countries. For disability prevention, individuals with high-risk chronic disease should be carefully treated in general and particularly for women.

Our research has several strengths. Much of the literature on disability in older populations focuses only on limitations in ADL and IADL. The measurement of disability among adults aged 50 and older, was based on a parsimonious set of eight health domains (vision, mobility, self-care, cognition, interpersonal activities, pain and discomfort, sleep and energy, and affect) in order to give a more complete picture of disability. Moreover this is the first kind of study which is revealing the fact that association of disease and disability has feminized.

In view of the social and the health policy perspective, this study is a timely attempt to fill a critical gap in the field of disability, health and social policy research. Providing health care, social and economic support for disabled population is not only a challenge for the

households but also for the state and the federal government of the states. In addition, the growing number of the older population with disabilities is not only a health concern but also a socioeconomic concern for these countries.

An advantage of this study is that it draws data from a population-based nationally representative sample survey to depict socio-economic inequalities in the occurrence of disabilities. Population-based large-scale surveys have their unique advantage over institution based studies in terms of their representativeness for the population as a whole.

However this study has some limitations. Firstly the analysis is based on self-reported data, and so incurs the possibility of report bias whereby response is influenced by people's understanding of questions, their experiences, expectations, and culture. Future studies should include physical assessment of functioning in multiple domains to minimize report bias and calibrate self-reports.

References

1. Arias-Merino, E.D., Mendoza-Ruvalcaba, N.M., Ortiz, G.G., Velázquez-Brizuela, I.E., Meda-Lara, R.M., Cueva-Contreras, J. (2012). Physical function and associated factors in community-dwelling elderly people in Jalisco, Mexico. *Archives of Gerontology and Geriatrics*, 54 (3), pp. e271-e278. Cited 1 time.
2. Atkinson, M., Zibin, S. and Chuang, H. 1997. "Characterizing quality of life among patient with chronic mental illness: Acritical examination of the self-report methodology." *American Journal of Psychiatry*. Vol.154, pp.99-105.
3. Audinarayana, N., & Sheela, J. (2002). Physical disability among the elderly in Tamil Nadu: Patterns, differentials and determinants. *Health and Population: Perspectives and Issues, 25*(1), 26-37.
4. Avlund, K., Lund, R., Holstein, B.E. and Due P. 2004. "Social relations as determinant of onset of disability in aging." *Archives of Gerontology and Geriatrics*. Vol.38, pp.85–99.
5. Brenda, Gannon. and Brian, Nolan. 2007. "The impact of disability transitions on social inclusion." *Social Science & Medicine*. Vol.64, pp.1425–1437.
6. Census. 2001. Registrar General of India. New Delhi.
7. Centers for Disease Control and Prevention. 2005. "Racial/ethnic differences in the prevalence and impact of doctor-diagnosed arthritis: United States, 2002". *Morbidity and Mortality Weekly Report. Vol*.54, pp.19–23.
8. Chen, R., Chen, G., Song, X.M., Zhang, L., Zheng, X.Y. (2010). Epidemiological study on disabilities among ethnic minorities in China. *Zhonghua liuxingbingxue zazhi*, 31 (5), pp. 538-543. Cited 1 time.
9. Claire, B., Marco, B., Anju, P., Debra, J. Z., Valery, W., David, M. and Josef, S. S. 2012. "The relationship between joint damage and functional disability in rheumatoid arthritis: a systematic review". ***Annals of the Rheumatic Diseases.*** Vol.71, No.6, pp.836-844.
10. Duba, A. S., Rajkumar, A. P., Prince, M., & Jacob, K. S. (2012). Determinants of disability among the elderly population in a rural south Indian community: The need to study local issues and contexts. *International Psychogeriatrics, 24*(2), 333-341.
11. Ezzati, M., Hoorn, S.V., Rodgers, A., Lopez, A.D., Mathers, C.D. and Murray, C.J. 2003. "Estimates of global and regional potential health gains from reducing multiple major risk factors". *The Lancet*. Vol.362, pp.271-280.
12. Feng, Q., Zhen, Z., Gu, D., Wu, B., Duncan, P.W., Purser, J.L. (2013) Trends in ADL and IADL disability in community-dwelling older adults in Shanghai, China, 1998-2008. *Journals of Gerontology - Series B Psychological Sciences and Social Sciences*, 68 (3), pp. 476-485.

13. Guallar, P., Sagardui, J., Banegas, J.R., et al. 2007. "Waist circumference as a predictor of disability among older adults". *Obesity (Silver Spring)*. Vol.15, pp.233–44.

14. Heider, D. et. al. 2007. "A prospective study of quality of life in schizophrenia in three European countries." *Schizophrenia Research.* Vol.93, pp.194-202.

15. Hirvensalo, M., Rantanen, T. and Heikkinen, E. 2000. "Mobility difficulties and physical activity as predictors of mortality and loss of Independence in the community-living older population." *Journal of American Geriatrics Society.* Vol.48, pp.493–98.

16. Houston, D.K., Stevens, J. and Cai, J. 2005. "Abdominal fat distribution and functional limitations and disability in a biracial cohort: the Atherosclerosis Risk in Communities Study". *International Journal of Obesity.* Vol.29, pp.1457–63.

17. Jiang, J., Tang, Z., Futatsuka, M. (2002). The impact of ADL disability on depression symptoms in community of Beijing elderly, China. *Environmental Health and Preventive Medicine*, 7 (5), pp. 199-204. Cited 4 times.

18. Jiang, J., Tang, Z., Meng, X.J., Futatsuka, M. (2002). Demographic determinants for change in activities of daily living: A cohort study of the elderly people in Beijing. *Journal of Epidemiology*, 12 (3), pp. 280-286. Cited 12 times.

19. Kromhout, D., Menotti, A., Kesteloot, H. and Sans, S. 2002. "Prevention of coronary heart disease by diet and lifestyle: evidence from prospective cross-cultural, cohort, and intervention studies." *Circulation Journal.* Vol.105, pp.893–98.

20. Larrieu, S., Peres, K., Letenneur, L., et al. 2004. "Relationship between body mass index and different domains of disability in older persons". *International Journal of Obesity*. Vol.28, pp.1555–60.

21. Leonardi M et al. (2006). MHADIE Consortium The definition of disability: what is in a name? Lancet, 368:1219-1221. doi:10.1016/S0140- 6736(06)69498-1 PMID:17027711.

22. Loeb ME, Eide AH, eds (2004). Living conditions among people with activity limitations in Malawi: a national representative study. Oslo, SINTEF, (http://www.safod.org/Images/LCMalawi.pdf, accessed 9 November 2009).

23. Luan, C., Liu, M.(2008). Comparison of prevalence of physical disabilities in year 2006 and 1987, in China. *Zhonghua liuxingbingxue zazhi*, 29 (7), pp. 639-642. Cited 2 times.

24. Lynne, C. Giles., Patricia, A., Metcalf, Gary, F. V., Glonek, Mary, A. Luszcz and Gary, R. 2004. "Andrews The Effects of Social Networks on Disability in Older Australians." Journal of Aging Health. Vol.16, pp.510-517.

25. Maciel, A.C.C. and War, R.O. 2007. "Influence of psychosocial factors on the functional capacity of elderly residents in northeastern Brazil". *Brazilian Journal of Epidemiology*. Vol.10, No.2, pp.178-89.

26. Masters, G. 1982. A Rasch model for partial credit scoring. Psychometrika 47: 149{174.

27. Mitra S, Posarac A, Vick B. (2011). Disability and poverty in developing countries: a snapshot from the world health survey.Washington, Human Development Network Social Protection, forthcoming.

28. Nagi, S.Z. 1991. "Disability concepts revisited: implications for prevention". Institute of Medicine, Disability in America: Toward a National Agenda for Prevention. National Academy Press: Washington, DC, U.S. pp.309–327.

29. Nilsson, C.J., Lund, R. and Avlund K. 2008. "Cohabitation status and onset of disability among older Danes: is social participation a possible mediator?" *Journal of Aging Health.* Vol.20, pp.235–253.

30. Oliver M. (1990). The politics of disablement. Basingstoke, Macmillan and St Martin's Press.

31. Parahyba, M.I. and Simões, C.C.S. 2006. "The prevalence of disability among the elderly in Brazil". *Ciência* & Saúde Coletiva. Vol.11, No.4, pp.967-74.

32. Paterson and Warburton. 2010. "Physical activity and functional limitations in older adults: a systematic review related to Canada's Physical Activity Guidelines". *International Journal of Behavioral Nutrition and Physical Activity*. Vol.7, pp.38.

33. People with disabilities in India: from commitments to outcomes. Washington, World Bank, 2009.

34. Ramsay, S.E., Whincup, P.H., Shaper, A.G. and Wannamethee, S.G. 2006. "The Relations of Body Composition and Adiposity Measures to Ill Health and Physical Disability in Elderly Men". *The American Journal of Epidemiology.* Vol.164, pp.459–469.

35. Rosa, T.E., Benicio, M.H.D.A., Latorre, M.R.D.O. and Ramos L.R. 2003. "Determinants of functional capacity in the elderly". *Rev Saude Publica*. Vol.37, No.1, pp.40-48.

36. Sato, S., Demura, S., Kobayashi, H. and Nagasawa, Y. 2002. "The relationship and its change with aging between ADL and daily life satisfaction characteristics in independent Japanese elderly living at home." *Journal of Physiological Anthropology and Applied Human Science.* Vol.21, No.4, pp.195-204.

37. Soham, Al, Snih., James, E., Graham, Y. F. Kuo., James, S. Goodwin., Kyriakos, S. Markides., and Kenneth, J. Ottenbacher. 2010. "Obesity and Disability: Relation Among Older Adults Living in Latin America and the Caribbean." *American Journal of Epidemiology*. Vol.171, No.12, pp.1282–1288.

38. Srinivasan, K., Vaz, M., & Thomas, T. (2010). Prevalence of health related disability among community dwelling urban elderly from middle socioeconomic strata in Bangaluru, India. *Indian Journal of Medical Research, 131*(4), 515-521.

39. The International Classification of Functioning. Disability and Health. Geneva, World Health Organization, 2001.

40. Tian, X., Tang, Z., Jiang, J., Fang, X., Wu, X., Han, W., Guan, S., Liu, H., Diao, L., Sun, F. (2011). Effects of smoking and smoking cessation on life expectancy in an elderly population in Beijing, China 1992-2000: An 8-Year follow-up study. *Journal of Epidemiology*, 21 (5), pp. 376-384. Cited 2 times.

41. Trani J et al.(2010). Disability in and around urban areas of Sierra Leone. London, Leonard Cheshire International.

42. Trani J, Loeb M.(2010). Poverty and disability: a vicious circle? Evidence from Afghanistan and Zambia. Journal of International Development, ,n/a- doi:10.1002/jid.1709

43. Ustün T, Chatterji S, Mechbal A, Murray C: **The World Health Surveys**. In *Health systems performance assessment debates, methods and empiricisms*. Edited by Murray CL, Evans B. Geneva: World Health Organization; 2003.

44. Verbrugge, L. M. and Jette, A. M. 1994. "The disablement process". *Social Science and Medicine.* Vol.38, pp.1-14.

45. Wan He, Mark N. Muenchrath, and Paul Kowal U.S. Census Bureau, Shades of Gray: A Cross-Country Study of Health and Well-Being of the Older Populations in SAGE Countries, 2007–2010,U.S. Government Printing Office,Washington, DC, 2012.

46. Whitlock, G., Lewington, S., Sherliker, P. et al. 2009. "Body-mass index and cause-specific mortality in 900 000 adults: collaborative analyses of 57 prospective studies. Prospective Studies Collaboration." *Lancet.* Vol.373, pp.1083–1096.

47. Wilson, M. 2004. Constructing Measures: An Item Response Theory Approach. Mahwah, NJ: Erlbaum.

48. Wolinsky, F.D., Coe,R.M., Miller, D.K. and Prendergast, J.M. 1984. "Measurement of the global and functional dimensions of health status in the elderly." *The Journals of Gerontology*. Vol.39, pp.88 –92.

49. World Bank. 2011. "List of Economies". Accessed on December 14, 2011, at <www.siteresources.worldbank.org /DATASTATISTICS/Resources/CLASS.XLS>.

50. World Health Organization. What Is Being Done to Improve the Daily Lives of People With Disabilities? Geneva, Switzerland: World Health Organization; 2010. (http://www.who.int/features/qa/16/en/index.html). (Accessed March 2, 2010).

51. Yelin, E., Trupin, L., Wong, B., and Rush, S. 2002. "The impact of functional status and change in functional status on mortality over 18 years among persons with rheumatoid arthritis." *Journal of Rheumatology*. Vol.29, pp.1851–57.

52. Zimmer, Z., Wen, M., Kaneda, T. (2010). A multi-level analysis of urban/rural and socioeconomic differences in functional health status transition among older Chinese. *Social Science and Medicine, 71 (3), pp. 559-567. Cited 3 times.*

53. Zoico, E., Francesco, V., Guralnik, J.M., et al. 2004. "Physical disability and muscular strength in relation to obesity and different body composition indexes in a sample of healthy elderly women". *International Journal of Obesity*. Vol.28, pp.234–41.

Table1: Selected Demographic and Socioeconomoc Characteristics of Population Aged 50 and Over: 2007-2010

	China	Ghana	India	Mexico	Russia	South Africa
Sample Size N	**13158**	**4305**	**6560**	**2301**	**3938**	**3836**
	%	**%**	**%**	**%**	**%**	**%**
Age						
50-59	44.9	39.7	48.6	48.1	44.1	49.9
60-69	31.9	27.5	30.9	25.6	26.7	30.6
70+	23.2	32.8	20.5	26.4	29.1	19.5
Sex						
Male	49.8	52.5	51.0	46.8	41.9	44.1
Female	50.3	47.6	49.0	53.2	58.1	55.9
Marital Status						
currently married	84.8	58.2	76.9	68.2	56.6	49.5
widowed	12.3	26.4	21.9	15.0	26.4	23.5
others	2.9	15.5	1.2	16.8	17.1	27.0
Educational Attainment						
No Formal Education	24.4	55.5	51.8	20.8	3.8	39.8
Upto Primary	24.9	8.3	19.0	36.6	5.2	17.2
6-10	36.6	27.0	19.1	33.2	35.6	29.6
10+	14.1	9.2	10.1	9.4	57.4	13.4
Work Status						
never worked	8.9	1.6	27.0	38.5	0.4	14.7
currently working	43.6	69.1	43.2	37.4	42.4	30.1
currently not working	47.4	29.3	29.8	24.1	57.2	55.2
wealth Quintile						
1	16.3	18.2	18.2	15.3	13.3	20.7
2	18.1	19.1	19.5	24.7	17.1	19.9
3	20.5	20.5	18.8	16.8	19.6	18.2
4	23.4	20.7	19.6	16.6	22.2	19.8
5	21.8	21.6	23.9	26.6	27.9	21.3
Residence						
Urban	47.4	41.1	28.9	78.8	70.1	64.9
Rural	52.7	58.9	71.1	21.2	29.9	35.1

Table2: Prevalence of disability among individuals(age≥50) in six countries, 2007

India	%
Total	56.31
Male	47.67
Female	65.36
China	
Total	21.93
Male	17.86
Female	26.56
Ghana	
Total	53.26
Male	46.36
Female	61.3
Mexico	
Total	35.49
Male	27.61
Female	42.37
Russia	
Total	37.02
Male	30.55
Female	41.86
South Africa	
Total	48.71
Male	44.06
Female	52.37

Table3: Prevalence of disability among individuals(age≥50) with different Diseases in six countries, 2007

Disability prevalence given presence of disease

Diseases	India % Total	India % Male	India % Female	India Female-Male	China % Total	China % Male	China % Female	China Female-Male	Ghana % Total	Ghana % Male	Ghana % Female	Ghana Female-Male	Mexico % Total	Mexico % Male	Mexico % Female	Mexico Female-Male	Russia % Total	Russia % Male	Russia % Female	Russia Female-Male	South Africa % Total	South Africa % Male	South Africa % Female	South Africa Female-Male
Hyper tension	60	50	67	17	27	21	33	12	58	51	63	12	39	33	43	10	46	38	51	14	61	57	64	7
Heart Disease	68	58	84	25	42	38	46	8	75	71	79	8	56	46	64	19	57	51	62	10	70	66	73	6
Diabetese	57	47	71	23	30	26	33	7	57	44	69	25	40	22	55	33	69	64	73	9	70	66	73	7
Arthritis	70	69	71	2	32	29	36	7	69	60	76	16	56	61	54	-7	56	51	58	6	74	78	72	-6
Chronic Lung Disease	78	74	87	13	36	30	44	14	70	70	70	0	45	50	42	-8	56	55	56	1	68	78	63	-15
Asthama	79	77	82	5	42	39	44	4	63	50	78	28	53	56	52	-4	62	76	57	-19	71	75	67	-8
Depression	79	75	83	8	37	19	49	30	78	70	83	13	65	49	67	18	44	25	47	22	83	82	84	2
Cataracts	69	58	78	20	37	30	42	12	76	64	89	24	53	35	66	31	64	62	65	4	60	63	58	-6