PART 1.

EVIDENCE OF SOCIAL INEQUALITIES IN CANCER

FOCUS 3.

Cancer survival in countries in transition, with a focus on selected Asian countries

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Introduction

Cancer survival is one of the cornerstones of the cancer control triangle. Like for the other cornerstones of incidence and mortality, social inequalities in cancer survival have been observed (Schrijvers and Mackenbach, 1994; Kogevinas and Porta, 1997). However, although data on cancer survival are generally available from high-income countries (HICs) (Ries et al., 2006; Sant et al., 2009), data on cancer survival from low- and middle-income countries (LMICs) and from countries in transition are scarce, suffer from methodological or quality limitations, or do not include all cancer types. Furthermore, data collection is often separated by large periods, preventing the evaluation of trends in survival.

Apart from several isolated case series in LMICs or countries in transition, a few centrally planned international collaborative studies, such as Cancer Survival in Africa, Asia, the Caribbean and Central America (SurvCan) (Sankaranarayanan et al., 1998; Sankaranarayanan and Swaminathan, 2011) and CONCORD (Coleman et al., 2008; Allemani et al., 2015), have been conducted. These collaborative studies have provided a template for the conduct of standard population-based cancer survival studies in LMICs, prompting a modest beginning, ensuring continuation, and also facilitating the systematic expansion to cover more regions.

Socioeconomic differences in cancer incidence and mortality are large, and it is generally acknowledged that such differences require suitable interventions in the area of primary prevention (Fox and Goldblatt, 1982; Volkonen et al., 1990; Swaminathan et al., 2009a; Bray et al., 2018). However, addressing the socioeconomic inequalities in cancer survival requires policy measures in the area of secondary prevention and treatment (Schrijvers and Mackenbach, 1994; Kogevinas and Porta, 1997). This focus addresses socioeconomic inequalities in cancer survival in several countries in Asia.

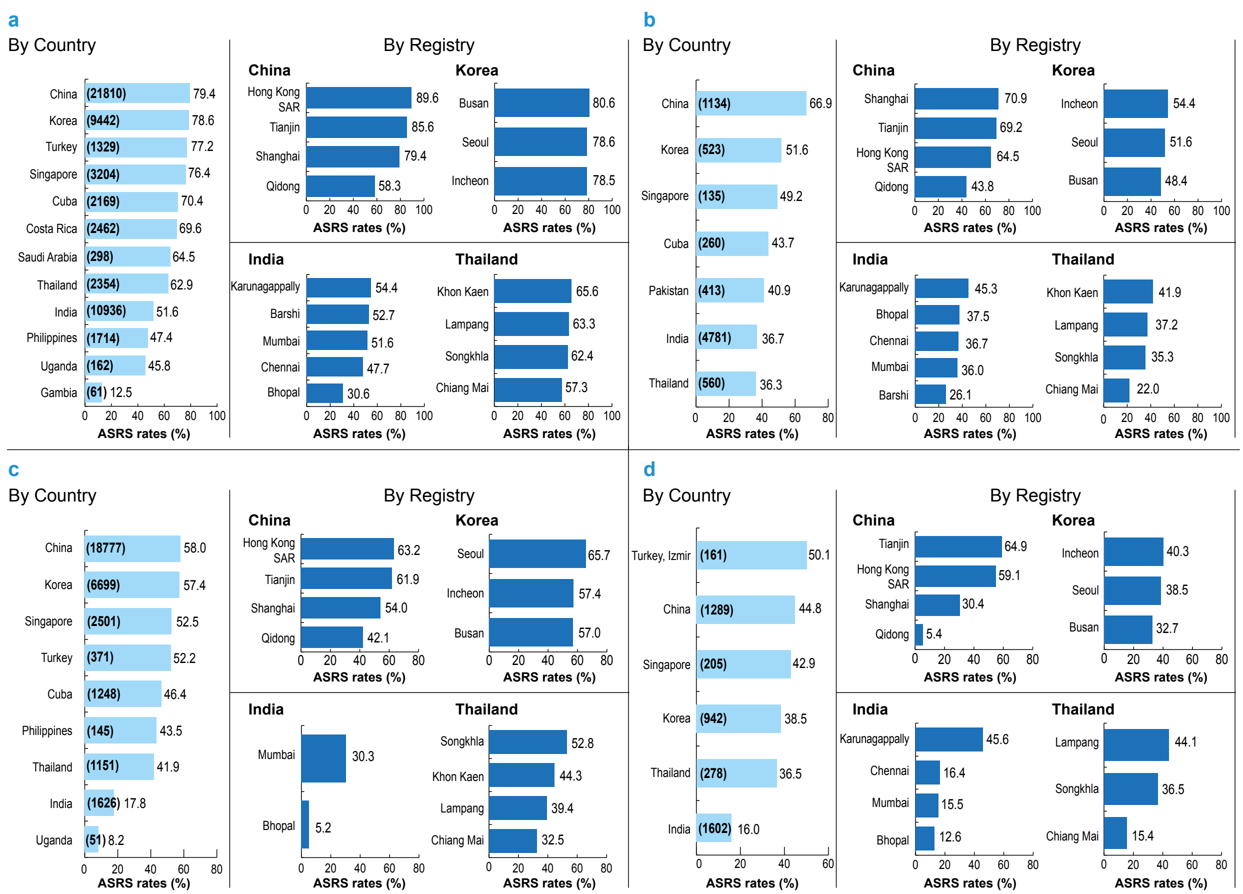
Between- and within-country relative survival rates from population-based cancer registries

Survival data from population-based cancer registry (PBCR) series provide an indication of average prognosis for all cancer types in a given region, generally with heterogeneous treatment status, and studies are heavily reliant on good-quality data and on the completeness of both the registration of cases and their follow-up. In addition to standard data quality control and centrally performed analysis, many registries in emerging economies in Asia and elsewhere, such as in Shanghai and Tianjin in China, in Costa Rica, in Cuba, and in Lampang in Thailand, have therefore adopted active methods to minimize the bias in survival rate estimation as a result of a lack of complete follow-up, thus allowing for more comparable survival statistics (Swaminathan et al., 2008a; Sankaranarayanan and Swaminathan, 2011; Allemani et al. 2015).

Age-standardized relative survival (ASRS) rates at 5 years after diagnosis in Asian countries are given in Fig. F3.1 both by country and by particular registries (rural or urban) within a country for cancer of the (a) breast, (b) mouth, and (c) colon, and (d) for lymphoid leukaemia. There is clear heterogeneity in ASRS rates 5 years after diagnosis both between and within several countries for different cancers (Fig. F3.1). The corresponding reference values of ASRS rates from the United States Surveillance, Epidemiology, and End Results Program (SEER) (Ries et al., 2006) and from the EUROCARE study on cancer survival in Europe (Sant et al., 2009) matched the highest values of ASRS rates observed in Asia. Within-country relative survival rates based on two or more PBCRs are reported for China, India, the Republic of Korea, and Thailand. The Republic of Korea reported the smallest inequalities in survival rates between the three urban registries (Busan, Incheon, and Seoul). Some differences were observed across China; these were most striking for lymphoid leukaemia, for which urban survival rates were much higher than those reported in the rural Qidong registry (Fig. F3.1d). Within-country differences in survival rates for all selected cancer types, with the possible exception of breast cancer, were observed in Thailand (a mixture of urban and rural populations) and in India (where the Bhopal, Chennai, and Mumbai registries cover urban populations and the Barshi and Karunagappally registries cover rural populations).

Overall, the 5-year ASRS rates within countries were higher in urban than in rural areas in the majority of

Fig. F3.1. Five-year age-standardized relative survival (ASRS) rates (%) by country (number of incident cases in parentheses) for 1990–2003 and by registries (period varies) for cancer of the (a) breast, (b) mouth, and (c) colon, and (d) for lymphoid leukaemia. SAR, Special Administrative Region. Source: compiled from Sankaranarayanan and Swaminathan (2011).

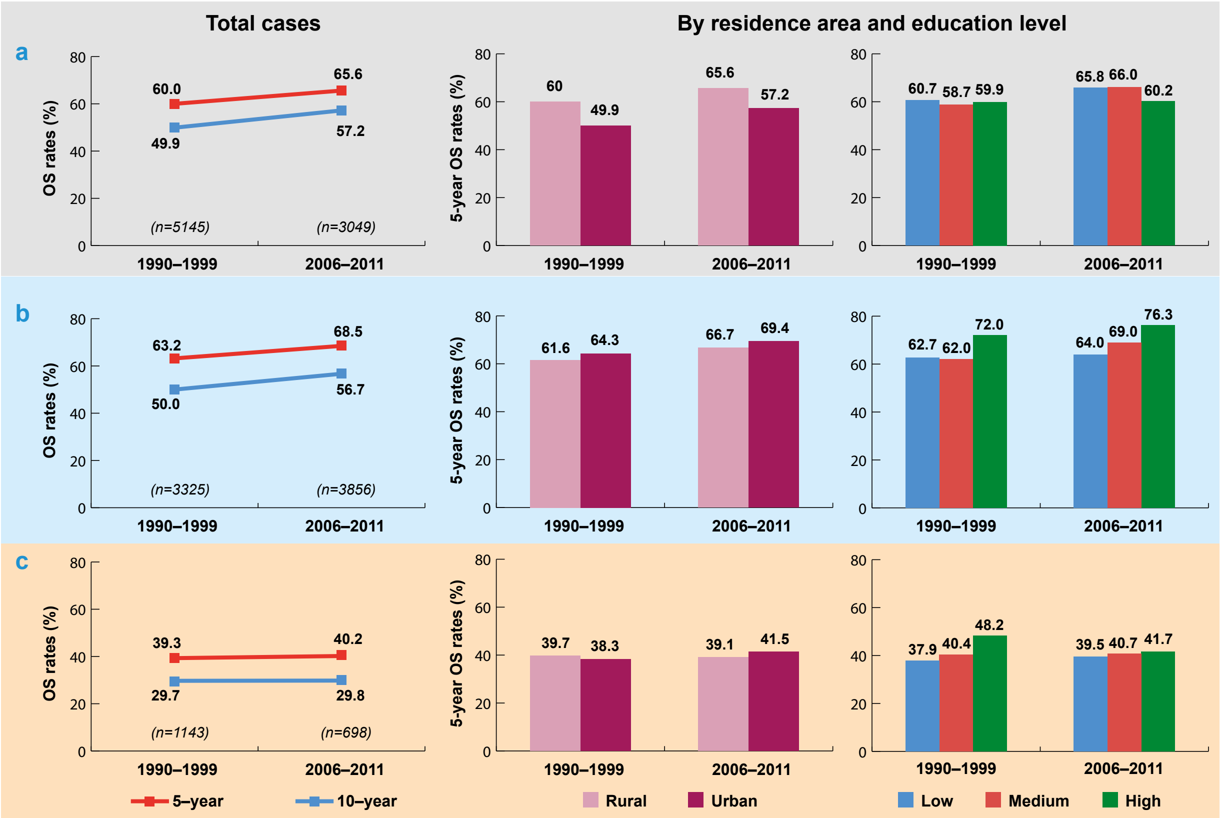


instances. The large differences in survival observed within countries in some instances (e.g. lymphoid leukaemia in China and India, or colon cancer in India) probably reflect within-country inequalities between urban and rural populations in the availability of, development of, and accessibility of cancer-related health services, and possibly in other social and disease-related factors (Sankaranarayanan and Swaminathan, 2011).

Overall survival rates from hospital-based cancer registries in India

Survival data from hospital-based cancer registry (HBCR) series generally provide the average prognosis among treated patients in a specific hospital, most probably representing the upper limit of average survival in the region. HBCRs represent an information platform where the treatment factor is uniform and, if the hospital receives patients from all strata of society, any observed differences in overall survival (OS) rate will reflect the inequalities with respect to social and disease-related factors. Fig. F3.2 depicts 10-year and 5-year OS trends for several common cancers observed in a HBCR at the Cancer Institute (Women's Indian Association), Chennai, India, during the two calendar periods 1990–1999 and 2006–2011, by type of residence area (urban or rural) and education level. OS rates increased between the two time periods for cervical cancer and breast cancer (at a faster rate in the 10-year vs 5-year data), but remained static for oral cancer. The increasing trend in OS rates for cervical cancer and breast cancer correlates well with reported achievements of clinical downstaging (the increase in the proportion of patients diagnosed at an earlier stage of the disease) and treatment milestones (the evolution of treatment protocols) over time in India (Shanta et al., 2013); however, for oral cancer, the unchanging high proportion of patients diagnosed at an advanced stage during both

Fig. F3.2. Five-year and 10-year overall survival (OS) trend for cancers of the (a) cervix, (b) breast, and (c) cheek observed in a hospital-based cancer registry including cases treated at the Cancer Institute, Chennai, India, during 1990–1999 and 2006–2011. Source: compiled from Swaminathan R, Rama R, Shanta V. Hospital Based Cancer Registry database, Cancer Institute (Women's Indian Association), Chennai, 2018.



periods has rendered any advances in treatment irrelevant and negligible in terms of improving survival.

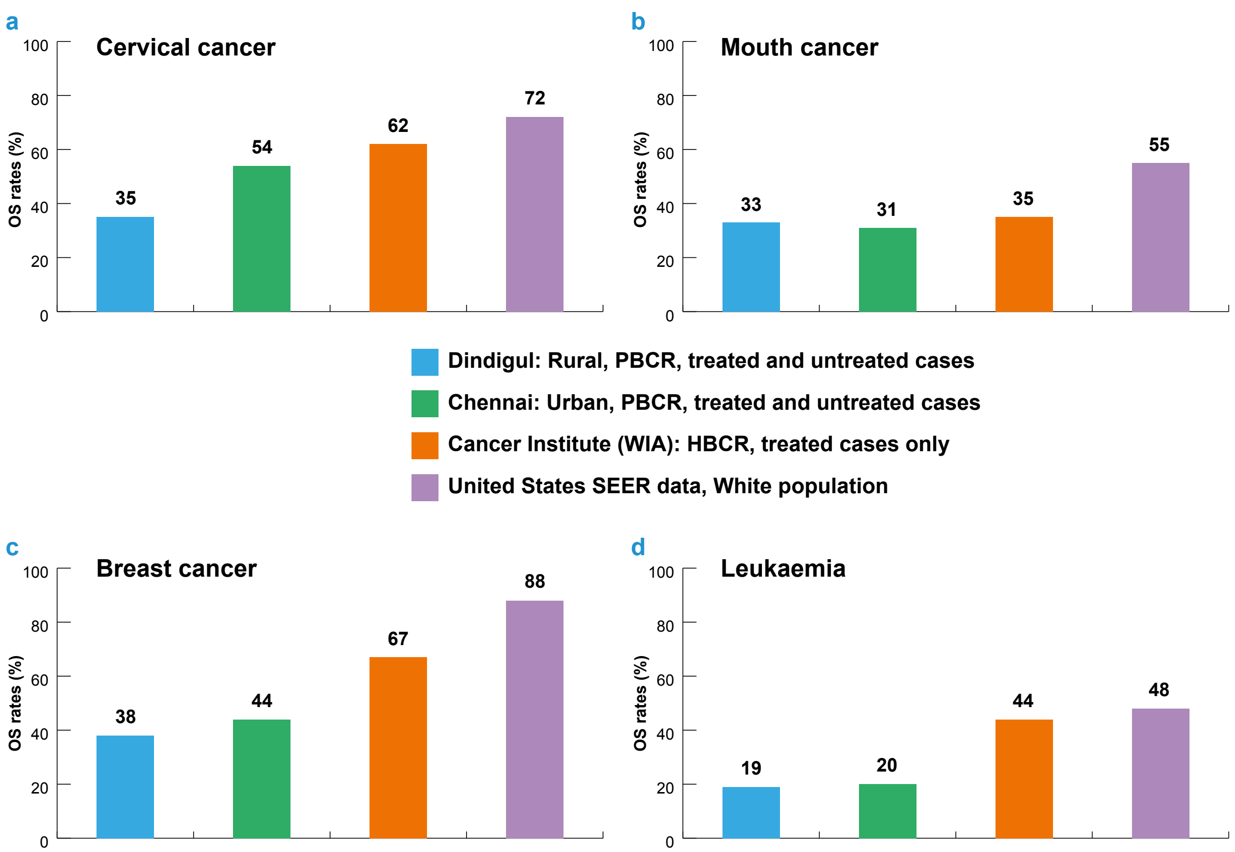
The contribution of social factors, namely type of residence area and education level, to OS rates was generally modest for these three cancer types in the Chennai region in India. The most marked differences were recorded in relation to breast cancer and education level during 2006–2011; the reported 5-year OS rate was an average of 12% higher for those with a high education level than for those with a low education level. In contrast, an inverse trend of OS rate with education level for cervical cancer was seen during 2006–2011, correlating with the observed increased incidence (Swaminathan et al., 2009a); this result calls for policies to improve awareness of cervical cancer and its prevention and early detection, even in urban areas.

Within-state and residence area type comparisons of overall survival rates in India

Fig. F3.3 shows the 5-year OS rates in the Indian state of Tamil Nadu for selected cancer types, comparing data from a rural registry (PBCR of Dindigul), an urban registry (PBCR of Chennai), and a HBCR (Cancer Institute, Chennai, registry including only treated cases), with United States SEER data used as an external reference. Overall, clear heterogeneity is observed for cervical cancer OS rates, with the lowest survival rate observed in the rural area of Dindigul. Heterogeneity is also observed for breast cancer OS rates, although to a lesser extent.

In contrast, no differences in oral cancer OS rates are observed between the rural and urban registries or between the PBCRs and the HBCR; this is because in India more than 50% of patients present with stage IV oral cancer, even in a

Fig. F3.3. Comparison of 5-year overall survival (OS) rates (%) between rural and urban population-based and hospital-based cancer registries in Tamil Nadu State, India, 1990–2003 (although the period varies for individual registries) and with United States SEER data for cancer of the (a) cervix, (b) mouth, and (c) breast, and (d) for leukaemia. HBCR, hospital-based cancer registry; PBCR, population-based cancer registry; SEER, Surveillance, Epidemiology, and End Results Program. Source: compiled from Swaminathan et al. (2009b).



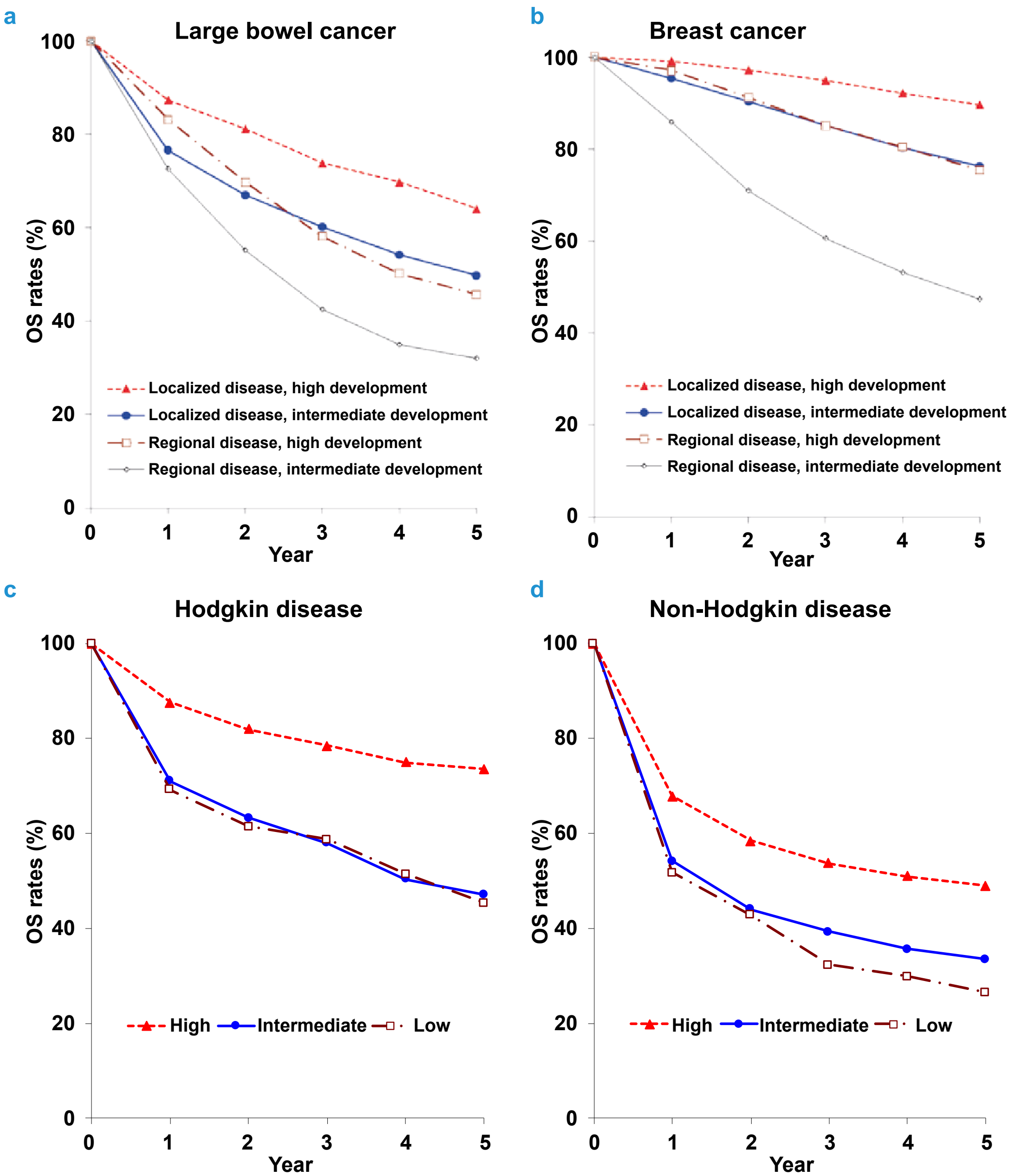
comprehensive cancer care facility (Swaminathan et al., 2009b).

Finally, the 5-year OS rates for leukaemia among the treated series in the Chennai HBCR are similar to those of the United States SEER White population, indicating that if an appropriate system is in place for correct referral of curable cancers to appropriate cancer centres and treatment is received, survival rates can be expected to be similar to those observed in HICs (Swaminathan et al., 2008b).

Comparison of cancer survival across different settings, with a focus on Asia and Africa

The inequalities in factors relating to the stage of disease at diagnosis and to access to health services

Fig. F3.4. Overall survival (OS) rates (%) among countries with health services with variable levels of development (high, intermediate, and low), 1990–2003 (period varies for individual registries), for cancer of the (a) large bowel and (b) breast by extent of disease (localized or regional), and for (c) Hodgkin and (d) non-Hodgkin lymphoma. Source: reproduced from Sankaranarayanan and Swaminathan (2011).



and treatment are among the major causes of the differential cancer survival patterns observed between most Asian countries; data quality issues, such as incomplete follow-up, differences in the proportion of death-certificate-only notifications, and inaccurate vital status, may also contribute. Fig. F3.4 shows the 5-year OS rates by clinical extent of disease for cancer of the (a) large bowel and (b) breast and by different levels of development of health services in selected countries (Sankaranarayanan et al., 2011) for (c) Hodgkin and (d) non-Hodgkin lymphoma.

In Fig. F3.4, health services with a high level of development are represented by Hong Kong Special Administrative Region, Singapore, and Turkey (specifically, the Izmir registry), health services with an intermediate level of development are represented by Costa Rica, Cuba, India, the Philippines, and Thailand, and health services with a low level of development are represented by The Gambia, Uganda, and Zimbabwe. Data from individual registries in the respective categories were pooled for this comparison of OS rates.

The OS rates of breast cancer patients with regional disease in countries with health services with a high level of development were similar to those of breast cancer patients with localized disease in countries with health services with an intermediate level of development; the two curves of OS rates are superimposed (Fig. F3.4b). For patients with cancer of the large bowel, a very similar situation was observed (Fig. F3.4a). The differences in OS rates between localized and regional categories of cancer of the large bowel, regardless of level of development of health services, indicate the potential of early detection to increase survival (Fig. F3.4a). The difference in OS rates between localized and regional categories of breast cancer was larger among countries with health services with an intermediate level of development than among those with health services with a high level of development (Fig. F3.4b). Although some misclassification between localized and regional disease cannot be ruled out and the proportion of cases with missing stage information varies greatly by country, intercountry differences in the availability of and accessibility of early detection and appropriate treatment are predominantly responsible for these results.

In the case of Hodgkin lymphoma, given the generally good prognosis, the low OS rates and the minimal differences in 5-year OS rates between the intermediate and low categories of development of health services indicate that all levels of suboptimal treatment will lead to similar survival rates (Fig. F3.4c). Non-Hodgkin lymphoma is more heterogeneous, with variable clinical behaviour and responses to treatment. The differences in OS rates for non-Hodgkin lymphoma between the countries with different levels of development of health services are therefore striking (Fig. F3.4d); these differences are possibly explained by the capacity of the health services to provide diagnosis, histological typing, accurate staging, and appropriate treatment (Sankaranarayanan et al., 2011).

Conclusions

It is evident from existing studies that inequalities exist and influence cancer survival patterns in countries in transition in Asia. Five-year OS rates show an increasing trend for most cancers, but relative survival differences persist between and within Asian countries, correlated with the level of development of health services, socioeconomic indicators such as area of residence (rural versus urban), or stage of disease at diagnosis. Care should be taken in future international studies to devise more suitable individual-level measurements of conceivable inequalities in social indicators (education level and occupation), disease (extent of disease or tumour stage), and treatment (access, modality, and compliance), as well as other population-level health-related factors (equality in availability and access), for a more objective appraisal over time of inequalities in cancer survival.

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