Importance of distinguishing disparities in survival from disparities in mortality

Like virtually all health disparities research, the study by Keegan et al.[1] overlooks the pattern whereby the rarer an outcome the greater tends to be the relative difference in experiencing it and the smaller tends to be the relative difference in avoiding it.[2-4] Like much health disparities research related to cancer (as discussed on the Mortality and Survival sub-page of the Scanlan's Rule page of jpscanlan.com [5]), the study speaks as if it is addressing disparities in cancer survival rates for Hodgkin lymphoma (HL), but analyzes relative differences in mortality rates. And it does so without recognition that one may often (if not usually) reach different conclusions about the comparative size of disparities depending on whether one examines relative differences in survival rates or relative differences in mortality rates.

Whether or not any conclusions that the study reached about the data it examined are affected by the fact that it examined relative difference in mortality rather than relative differences in survival, the study provides some useful data for illustrating certain points about the above-described statistical patterns. The following discussion is based on a number of tables found in a PDF file on jpscanlan.com.[6] Table A is based on Keegan's Table 5. That table showed for various demographic (or HL-stage) groupings, the 5-year, 10-year, and 15-year survival rates for high and low socioeconomic (SES) groups (the former being the top two income quintiles and the latter being the bottom three) both for persons aged 15 to 44 years and persons over 45. Table A to this comment adds the mortality rates to those data.

Table B to this comment then shows the ratios of the survival rates of high SES to low SES and the ratios of the mortality rates of low SES to high SES for each grouping for which information is available. Table C reorders the columns somewhat in a way that may facilitate the reader's consideration of the comparisons described here. These tables will support the points that follow and enable the reader to evaluate the way the observations made about certain patterns comport with the reality.

One observes in this data that for whites, men, women, and each cancer stage, among each of the temporally defined survival categories, the relative difference in mortality is greater among the young (where mortality is less common) while the relative difference in survival is greater among the old (where survival is less common). We do not observe consistent patterns for minorities along these lines. The inconsistencies with regard to

minorities may involve the fact that fewer minorities are analyzed, the fact that meaningful differences outweigh the statistical tendencies, or both. It must always be borne in mind that patterns are functions of both the prevalence of an outcome and the size of the difference between the underlying distributions of factors associated with the outcomes being studied.[2,7-9].

In any case, among whites, among men, among women, and (with very minor exception) among each of the three grades of cancer, were one were to compare the effects of low SES on cancer outcomes of the young and the old, one would reach different conclusions depending on whether one analyzed mortality or survival disparities. That is, one would conclude that low SES status increased mortality more among the young than the old, but that low SES status reduced survival more among the old than the young.

Further, from the last three rows one can observe (with only minor qualification) that, for all age groups and for all survival categories, the higher the staging of the cancer, the smaller is the degree to which low SES status increases mortality but the larger is the degree to which low SES reduces survival. See discussion on the Mortality and Survival page of the article by Tehranifar et al.,[10] where the authors found important implications in the fact that racial differences in survival were greater among more treatable cancers (though they in fact analyzed racial differences in mortality).

It does not appear that conclusions of the study were affected by analyzing mortality rather than survival (though where the study lists, for example, higher percentage increases in mortality caused by low SES among younger than older subjects, the pattern would be reversed if shown in terms of percentage decreases in survival). But it warrants note that the study emphasize the progress recently achieved in the reduction of HL and the progress that one hopes will be achieved in the future. Thus, it should be borne in mind that, just as past reductions may well have done, further reductions will tend to reduce relative differences in survival rates but increase relative differences in mortality rates. So it is quite important that one distinguishes between the two.

Of course, for research into the effects of SES on HL outcomes – and whether those effects are increasing or decreasing – to be truly useful, such research must be undertaken with recognition of the ways that standard measures of differences in outcome rates are affected by the overall prevalence of an outcome and endeavor to employ measures that are not so affected. One such measure is that discussed on the Solutions sub-page of the Measuring Health Disparities page of jpscanlan.com[11]). Table D in the tables document applies that method to figures in Keegan's Table 5. One may draw certain inferences about the varying effects of low SES on HL outcomes from the figures in Table D. I merely note here that the substantial variations in the minority figures by age and temporal survival category suggest that sample sizes may be too small to allow the drawing of firm inferences about such patterns.

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