Age misreporting in Malawian censuses and sample surveys: An application of the United Nations' joint age and sex score

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The impact of age in demographic analyses, factors associated with age misreporting, the United Nations' procedure of evaluating age statistics and the application of this procedure to Malawian censuses are discussed. Although age reporting still remains inaccurate, there is some evidence to suggest a slight improvement in the quality of age reporting. Age misreporting varies from one region or district to another. These variations are explained in terms of the existing social, historical and cultural differences within the country.

Introduction

Age is the most important variable in demographic analyses. It is affected by and a determinant of social, economic and demographic variables. Age is indicative of entry into education, the labour force and marriage on the one hand, while, on the other hand, high fertility or low infant mortality rates imply that there are more people under the age of 15. High levels of literacy usually point to more accurate reporting of age statistics.

As a result of this two-way relationship, age not only forms the basis of classification for most demographic variables but a more accurate knowledge of the age of a population is essential for successful social and economic planning. To underline the importance of age the United Nations (1980) strongly recommends that developing countries should include a question on age in their censuses and demographic surveys; and Shyrock and Siegel (1973) argue that no census is worth the name if it excludes a question on age.

Unfortunately, studies on age statistics of developing countries have revealed enormous distortions (Blacker, 1969; Byerlee & Terera, 1981; Caldwell, 1966; Caldwell & Igun, 1971; Ewbank, 1981). It was found that people tend to round off their age to the nearest figure and that some ages, for example those ending in 0 or 5, are preferred while those ending in 1 or 9 are avoided (Carrier & Hoboraff, 1971). The reason for these distortions are varied and include ignorance of true age, instructions given to enumerators, methods used to collect age statistics and various other social, cultural and even political reasons.

There is also a tendency to under- or overstate age in order to suit certain social and biological expectations. For example, young children below the age of five, found playing with their peers at the time of the enumeration, may be reported as belonging to the age group 5 to 9, and females in the age group 10 to 14 who have passed puberty (menarche) may be recorded in the age group 15 to 19, especially if they are married or have children. Likewise, women above the age of 40 who are still rearing (nursing) their own children may be assigned to a younger age group. Furthermore there is a tendency, especially among the elderly males, to exaggerate their age for prestige purposes or perhaps a desire to be granted a senior citizenship status which, in some cases, exempt people from paying tax.

Awareness of these distortions and inaccuracies in reported age statistics troubles demographers so much that evaluation and adjustment of age statistics have become an integral part of demographic analyses. This article therefore evaluates the Malawian data set to detect the nature and extent of age misreporting in the country.

Three reasons in particular have compelled the researcher to undertake the analysis. Firstly, the desire to isolate genuine distortions (e.g., caused by famine and natural disasters) from age misstatements. Secondly, since it is hoped that the characteristics of the reported age distribution will be used to estimate fertility at a later stage, the examination of age data was felt to be of paramount importance as a means of providing an in-built mechanism of assessing the plausibility of the derived estimates. Thirdly, it was anticipated that age errors might provide clues to other weaknesses in the data.

Methodology

The most commonly used method of evaluating age reporting in five-year age groups is the procedure advocated by the
(above 50 years) rose above 100.

The overall pattern resembled that reported in respect of other African countries (see Table 1 and Table 2), except that in Malawi the deficiency in the male population extends over a prolonged age interval and persists up to very advanced ages. Two factors may account for the apparent "loss" of males: excess male mortality or permanent migration, but conclusive evidence cannot be found for either of these suppositions.

The consistency of the above pattern in the three censuses and the three sample surveys probably suggests that the same underlying causes are present in all the data sources. The small differences observed may be attributed to sex differentials in enumeration, the incidence of migration, age misstatement and sampling errors in the case of the demographic surveys. Nevertheless, some of the differences are worth commenting on.

The 1984 ASSRs show an increase in the age group 15 to 19 years, instead of in the age group 10 to 14 years, as depicted in the other data sources. This may be due to over-enumeration of males in the 15 to 19 year age group, omission or under-reporting of female in the 15 to 19-year age group or the transfer of women in this age group to the next higher age group. Apparently there is nothing in the male distribution to suggest that males in this age group were over-enumerated. The second and third factors may be attributed to the fact that the survey was conducted during the group of the mother indicates no preferential reporting of children of one sex as against the other. It anything, more males than females should be expected to be affected by this error as the school attendance rates for males are higher. In addition, seminars proceedings on the "Value of children in Malawi" suggest that parents in the country give equal preference to male and female children although some type of "mixture" of the two sexes is desired in a family (Demographic Unit, 1987).
<table>
<thead>
<tr>
<th>Region</th>
<th>1966 Sex score</th>
<th>Age score</th>
<th>UN score</th>
<th>1977 Sex score</th>
<th>Age score</th>
<th>UN score</th>
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</table>

In cases where the respondents (or enumerators) had to estimate the age of females on physical and biological factors such as marital status and number of children, it appears as if they may have reported (or assigned) ages higher than the actual ages. This resulted in females in the age group 15 to 19 years being shifted into the age group 20 to 24 years. This may also have been deliberate (either on the part of the respondent or the enumerator) in order to include the females in the individual survey. The fact that more females were recorded in the age group 20 to 24 years than in the age groups 15 to 19 years or 25 to 29 years seems to confirm this probability.

The very low sex ratio in the age group 50 to 54 years may be due to the transfer of females/males in the age groups 55 to 59 years. The sex ratios for both the Central and the Southern Regions show a gradual increase, a feature which is noticed in the Northern Region after the age of 50 years. The explanation for this seems to lie in the fact that in this age the Northern Region continues to send people to work in either the Central or the Southern Regions. A very rapid increase in the Southern Region in 1966 and in the Central Region in 1977 probably indicates the net effect of migration being in favour of the former in 1966 and the latter in 1977.

The same pattern of ASSRs is also noticed at the district level, the only exception being where urban localities in some
districts have facilities to attract people from other districts. The districts are Blantyre (in 1966) and Lilongwe, Blantyre, Kasungu and Machinga (in 1977). The ASSRs for these localities resemble the general pattern described above up to the age 25 years, after which the ratios increase with age.

United Nations' Sex Ratio Scores were calculated and indicate that the quality of the data for Malawi as a whole has been getting poorer and poorer at each succeeding enumeration. Regional differentials reveal that the quality of the data is better for the Northern Region than for the Central and Southern Regions. The regional differentials are however very small in the case of the 1966 census. Although the quality of the data (as measured by the sex ratio score) deteriorate in all the regions, the decline is more pronounced in the Central and Southern Regions than in the Northern Region. Moreover, the districts which show the largest increase in the sex ratio score (Mzimba in the north; Kasungu, Nchisi and Machinga in the centre; Mulanje, Chikwawa and Nsanje in the south) have either experienced substantial immigration or were more likely to have been affected by the large influx of people from Mozambique. It is therefore tempting to attribute the observed changes in the sex composition of the population to changes in the structure of the population - caused by migration rather than errors in age reporting. It is suggested that, at national level, migration has affected the reported age distribution more in terms of a reduction in the number of people leaving the country than in terms of the influx of returning migrants.

**Age ratio analysis**

Age ratios are expected to be close to 100 and any deviation from this is an indication of the presence of age errors. Age ratios greater than 100 represent over-enumeration of the age or age group. In the case of under-enumeration, the ratio is less than 100. Age ratios therefore serve as measures of net age misreporting.

The overall pattern of the two censuses is the same. The age groups 5 to 9, 15 to 19, 25 to 29, 35 to 39, 45 to 49 and 55 to 59 years are over-enumerated and the rest are under-enumerated. The 1972 and 1982 sample surveys indicate over-enumeration at age groups ending in the digit 4. In the case of the 1977-census, where age statistics were tabulated by single years, over-enumeration was certainly due to a concentration at the preferred end digits in these age groups (NSO, 1984). As far as the 1966-census is concerned, it can be inferred that the same end digits were preferred, especially the end digit 5.

The degree of fluctuation in age ratios increases with advancing age and is higher among males than females. This underlines the fact that age misreporting occurred more often at older ages: as most elderly people do not know when they were born and cannot state their ages accurately. The pressure to exaggerate one's age in the case of males is also higher in the advanced age groups.

**United Nations' Joint Age-Sex Score**

The United Nations' Joint Age and Sex Scores presented in Table 1 represent summarised measures of age distortions and merely confirm that which has already been discussed in the preceding paragraphs. The United Nations has provided two standards to evaluate these scores. In their 1952 publication they suggested that if the joint score is less than 20, the distribution is accurate, if the score lies between 20 and 40 the distribution is inaccurate, and if the scores are above 40 (as in the case of Malawi as a whole), the age distribution is highly inaccurate. In 1952 they further recommended that an age ratio of 2.6 for males and 2.4 for females and a sex ratio score of 1.5 (implying a joint score of 9.5) should be accepted as a minimum standard. The age distribution for Malawi are highly distorted and reflect very rough reporting. However, the overall quality is comparable to that of neighbouring countries and is as expected for a developing country (see Table 2 and Table 3).

Regional differentials show that the age distribution for the Northern Region is the least distorted, followed by the Central and the Southern Regions respectively. This pattern is to be expected, given the level of literacy in the Northern Region. Furthermore, education has had a long history in the Northern Region as a result of the pioneer work of Scottish missionaries. This implies that the understanding of the "western concept of age" together with all the social stigmas attached to it, are very well established and understood in this region - more so than elsewhere in the country. More accurate reporting of age is therefore to be expected in this region.
Table 3. Sex and age ratio scores and United Nations’ Joint Age-Sex Score for selected African countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Date</th>
<th>Sex score</th>
<th>Age Score</th>
<th>UN Joint Age-Sex Score</th>
</tr>
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<td></td>
<td></td>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
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<td>22.6</td>
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<td></td>
<td>1976</td>
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<td>10.1</td>
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<tr>
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<td>10.1</td>
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<tr>
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<td>8.6</td>
<td>8.7</td>
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Table 3. United Nations’ Age-Sex Scores for Malawi, 1987

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<th>Population</th>
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<th>Analysis of Age Ratios</th>
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<td></td>
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<td>Female</td>
<td>Male</td>
</tr>
<tr>
<td></td>
<td>Sex ratio</td>
<td>Difference</td>
<td>Age ratio</td>
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<tr>
<td>0 - 4</td>
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The very process of "age estimation" which, in certain cases, involves estimating the age of one member of the household with some precision and then calculating the age(s) of the other member(s) relative to the first one, is likely to work better in the Northern Region than in the other regions. This stems from the fact that the probability of finding one member of a household who can estimate his/her age with some precision is higher in this region than in the remaining two regions. The following quotation indicates that this method of age estimation was used in Malawi:

"Once a year of birth for one child in the family is known and the difference (which might be given in terms of... two or three rain seasons) is known, there can be some association from one year of birth enabling the dates of birth of the other children of that family and also their cousins living near them to be determined (NSO, 1977:7)."
Rural-urban differentials

With the exception of the 1972 sample survey, Table 4 indicates that age is better reported in the rural than in the urban areas. This is contrary to what one would expect. However, the same phenomenon has been noted in the case of Nigerian women. In view of the dearth of information about this phenomenon any explanation can only be speculative. It appears that this stems from rural to urban migration. Urban localities tend to attract a large number of people from the rural areas, some of whom are illiterate and cannot accurately report their ages. Since urbanites are generally regarded as relatively educated, well-informed and more knowledgeable than their rural peers (or they regard themselves as such until proven otherwise), they are not likely to admit that they do not know their ages in case that will be interpreted to mean that they are not educated, illiterate or both. Hence they are forced to give the best guesstimate that comes to mind. The anomaly observed in the 1972 data can be attributed to the fact that the 1972 sample survey was dominated by the urban stratum.

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<tr>
<td></td>
<td>1982</td>
<td>18.1</td>
<td>9.9</td>
<td>9.5</td>
</tr>
<tr>
<td></td>
<td>1984</td>
<td>23.7</td>
<td>4.7</td>
<td>15.9</td>
</tr>
<tr>
<td>Bounzy City</td>
<td>1977</td>
<td>17.6</td>
<td>12.2</td>
<td>16.2</td>
</tr>
<tr>
<td>Lilongwe City</td>
<td>1977</td>
<td>22.3</td>
<td>13.3</td>
<td>19.6</td>
</tr>
</tbody>
</table>

Changes in quality of age statistics in Malawi

It is expected that as the country develops with the passage of time, the quality of age reporting will also improve. If the 1977-census and the 1984-survey figures are excluded, Table 4 confirms this supposition. In the case of the 1984 survey, deliberate falsification in order to be included in the sample may have caused the highly distorted age structure. It is rather difficult to explain why the 1977 joint score is somewhat higher. However, two points should be borne in mind when examining the 1966 reported age distribution. Firstly, the "not stated"-category was prorated although the formulas used are not given. It is possible therefore that prorating more or less produced results similar to the smoothing of the age distribution. Secondly, the 1966-census made use of a "year of birth"-question for obtaining age statistics. Studies in other countries have established that age distributions obtained from the reported "year of birth" are less distorted than those obtained from "age in completed years"-type of questions. This probably explains why age distortions are less pronounced in 1966 than in 1977. In practice, however, there seems to be little distinction between the two. It often happens that when respondents are asked to give their year of birth, they give their age instead. The opposite is also true. The slightly lower joint score for the 1972 survey could be partly explained by the sampling variations discussed above. It is therefore possible to conclude that the quality of the reported statistics has improved during the period under study.

Conclusion

Although age misreporting errors have plagued demographers for centuries, studies that document the nature and extent of such errors in small countries such as Malawi are few. Recognising this handicap, the nature and extent of age misreporting in the Malawian censuses and surveys were investigated. One of the procedures proposed by the United Nations for evaluating age distributions in the five-year age groups was followed. The age distributions as reported in post-independence Malawian data sources were used.

No attempt has previously been made to apply the method to regional and district level data. The application has revealed interesting regional and district-level differences which are partially related to variations in the level of social
and economic development within the country.

The major finding is the fact that the quality of age reporting, as reflected in the censuses, has improved in Malawi. It should however be noted that an understanding of the sources of age misreporting is fundamental to the improvement of age reporting. The effect of age misreporting should be taken into account and ages adjusted during the analysis of census and survey data. It is hoped that this article on age misreporting in Malawi will contribute to improving age reporting in future censuses and surveys.

Notes

1. The researcher is also involved in a project entitled Estimation of fertility levels, trends and differentials in Malawi.

2. ASSRs are the number of males in a given age group per 100 females in the same age group, that is, males in a given age group divided by females in the same age group multiplied by 100.

3. Age ratio is the ratio of the reported population in any given age group to the average of its two adjoining age groups.

4. The average of successive differences of the age specific sex ratios is called Sex Ratio Score, whereas the average of the deviations from 100 of the age ratios is called Age Ratio Score.

References


Demographic Unit, 1987


