Different patterns of male and female deaths in 2015 in English and Welsh local authorities question the role of austerity as the primary force behind higher deaths

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Contributors

RJ has a 25-year career in health service analysis with over 200 papers, and is the sole author of this short research paper.

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Abstract

Recent studies have suggested that austerity led to an increase in deaths in 2015 in England and Wales. Given the potential implications to government policy this study explores conflicting evidence which suggests that austerity may not be the principal driving force for increased deaths. Namely, there are unexplained statistically significant decreases in deaths in a number of local authorities, there are conflicting increases/decreases in deaths between males and females living in the same local authority, and that very small area-based deprivation score or social grouping shows no correlation with the percentage increase in deaths. Fundamental evidence supporting the assertion that austerity led to higher deaths appears to be entirely lacking.

Key Words

Austerity, deaths, mortality, England and Wales, deprivation, social group, gender, emerging infectious diseases

Part of a longer series of papers, see: http://www.hcaf.biz/2010/Publications_Full.pdf

Introduction

The two recent essays in JRSM and an editorial in the BMJ regarding highly concerning increases in mortality in England and Wales seen in 2015, during a period of financial austerity, are welcome attempts to unravel a complex issue [1-3]. While international evidence indicates that a toxic mix of high unemployment and a simultaneous reduction in spending on both health and social care do lead to higher deaths [4], the comparatively moderate austerity experienced in the UK lacks many of these elements, and certainly did not suddenly occur in 2015. However, the austerity theory appears to contradict the conclusions reached in a series of papers previously published in FGNAMB [5-8].

Deaths are displaying complex trends

Analysis of complex trends in deaths in UK local authorities has shown that deaths have been exhibiting curious on/off or high/low behaviour over many years [9]. In addition, male and female deaths in English Mid Super Output Areas (MSOA) behave as if the genders are separate compartments, with semi-permanent (on/off) increases in deaths in each gender lagging behind the other in an apparent random manner [8]. Further studies using the English Output Area Classification (OAC) of social groups identified that this male/female behaviour is additionally moderated by social group, i.e. social groups were behaving in a roughly similar way irrespective of their location in different local authorities [10,11].

Deaths in England and Wales

It should further be noted that in Wales, Health and Social care are integrated and that the Welsh government took specific measures to mitigate the effects of austerity upon Welsh local authority social care budgets. However, both England and Wales experienced an almost identical increase in deaths in 2015, as revealed in a moving (running) 12-month total (fig 1), and in addition show a curious pattern of on/off step-like changes in deaths. In a moving total, on/off or high/low switching is detected at the point that the moving total changes slope, with the slope being a measure of the magnitude of the sudden step-like

on/off change imposed on the system. This unusual pattern is evident before austerity was even conceived (fig. 1), and the magnitude of these on/off events is partly concealed by an overall trend to lower total deaths between 2001 and 2009.

Differences between the genders

The average increase in deaths across England and Wales in 2015 compared to 2014 shows a degree of female specificity with a 5% increase in male deaths and a 6% increase in female deaths. Female specificity has been a hallmark of similar surges in deaths prior to 2015 [5-8,10-11]. While there may be more elderly females alive and potentially suffering the effects of austerity, the percentage increase in deaths among males and females should be similar because they both compete for the same social care resources.

Hence, if austerity were the principal driving for the increase in deaths in 2015, it would be logical to expect that both female and male deaths show a similar percentage increase in each local authority, since the degree of local austerity applies to all residents equally without discrimination based on gender. Additionally, some local authorities (suffering the highest relative austerity) should show a consistently higher percentage increase for both genders.

On the other hand, even if elderly females were subject to higher deprivation in general, this does not explain the anomalous situation observed in outer London (n=32,521 deaths in 2014) with a 7% increase in male deaths compared to 4% in females, or in Essex (n=13,594) with a 6% increase in male deaths compared to 4% in females. Nor does it explain the equally curious situation in Lancashire (n=12,000) with a 0% increase in male deaths, or in Birmingham (n=8,516) with a -2% reduction in male deaths [12].

Analysis of the change in male and female deaths for local government areas in 2015 compared to 2014 (fig. 2) shows that contrary to expectation there is no correlation between the change in male and female deaths. Additional analysis shows that the difference in the percentage increase in female versus male deaths was higher that the upper 95%

confidence interval in 17% of local authorities (female deaths predominate) and below than the lower 95% confidence interval in 21% of local authorities (male deaths predominate), i.e. the inconsistency between the genders is far beyond anything arising from chance and is not restricted to just one gender.

As highlighted above, austerity is unable to explain why male/female deaths show a statistically significant reduction in many local government areas. Indeed, this behaviour appears to replicate that previously reported in FGNAMB using MSOA data [8], and reinforces the observation that the conclusions based on calendar year data can be highly misleading. This difference appears to emanate out of variable time-lags between the genders in the initiation of periods of higher deaths [8]. Austerity should not generate variable time-lags since it is progressive and applies to both genders.

No effect due to deprivation or social group

Clearly the above findings cast doubt on the role of austerity. Indeed, should austerity be at work it would be expected to affect the most deprived locations more so than the least deprived. In England, an Index of Multiple Deprivation (IMD) is available for small areas. The IMD is based on the concept that deprivation is better measured across multiple domains. The first study was produced by the Social Disadvantage Research Centre at the University of Oxford (released in 2007) identified seven primary aspects of deprivation (income, employment, health and disability, education skills and training, barriers to housing and services, living environment, and crime) [13-15]. Each aspect has further statistically independent sub-domains, and all are weighted according to importance to give the final composite score. IMD can range from 1 (least deprived) to 100 (most deprived), and the national average IMD score is around 22 units.

It has been recently demonstrated that there is no correlation between local authority IMD average score and the increase in deaths in 2015 [16]. It could be argued this apparent lack

of relationship arises because the local authority deprivation score is too crude, and that it is the small-area deprivation score affecting individuals which matters.

As mentioned above, if austerity were a major driving force then the most deprived (highest IMD score) should show the highest increase in deaths since IMD is well correlated with income [15]. This potential relationship has been tested for the residents of London (fig. 3). London has been chosen since it contains examples of highest and lowest deprivation (and income). As can be seen there is no correlation between the increase in male/female deaths and the small-area IMD score applicable to those residents. An alternative to deprivation is social group and a similar lack of any correlation between the increase in male and female deaths was obtained using the London Output Area Classification (LOAC) of social groups (data not shown) [17].

It can be categorically stated that the increased deaths in 2015 between males and females shows no correlation with deprivation or social group, and hence, the fundamental principles inherent in the austerity theory simply do not apply to the actual behaviour observed among residents in England and Wales.

Conclusion

We are clearly dealing with something of far greater complexity than simple austerity, and as such, additional research is required to elucidate the exact cause(s). Future research needs to abandon simplistic calendar year comparisons, as has been demonstrated on several occasions in FGNAMB [5-8,11].

It would be unfortunate to fall into the trap of thinking that additional social care funding, however desirable, will reverse the increase in deaths. Indeed, as far as can be discerned the highly nonlinear patterns of increased deaths in 2015 follow mechanisms consistent with a genuine infectious outbreak [5-11,13], which strikes rich and poor alike.

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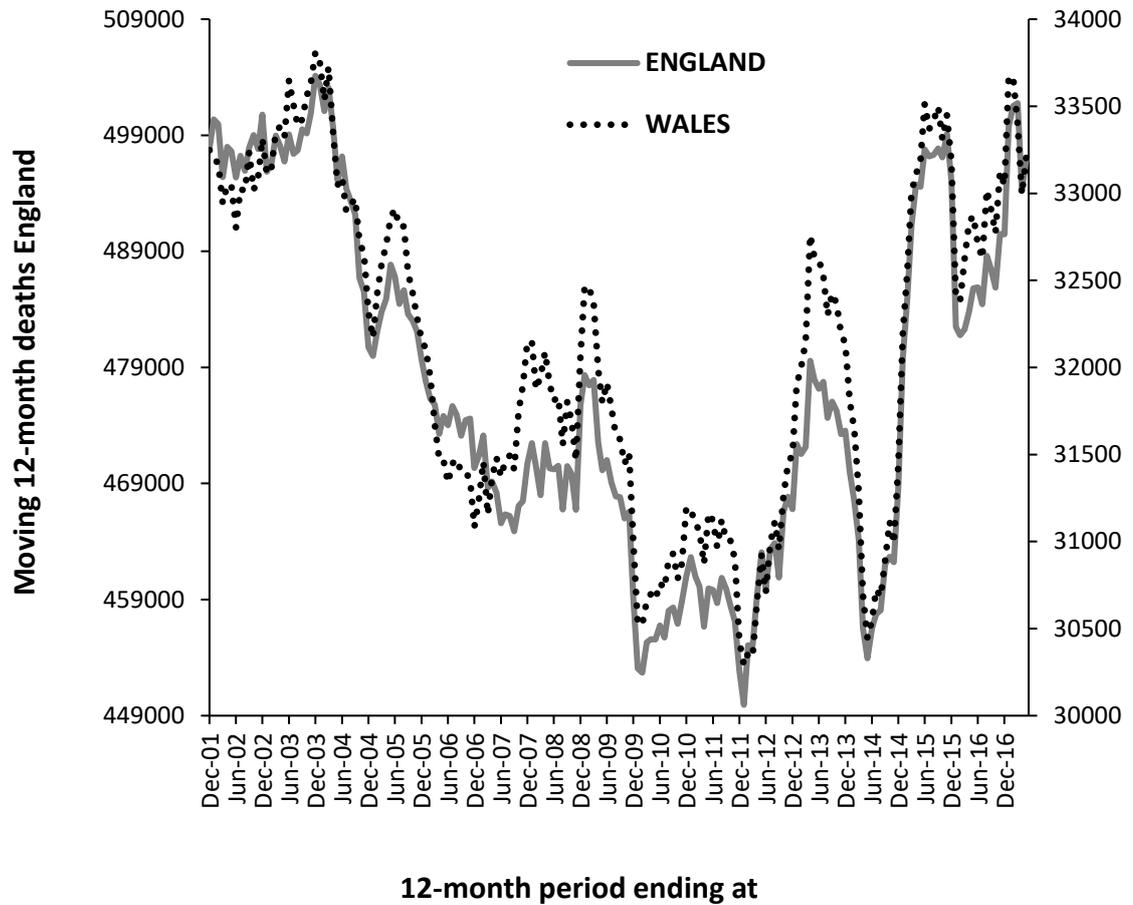
Figure 1. Moving (running) 12-month total deaths in England and Wales, 2001 to 2017

Footnote: Recall that each point in a moving total is a 12-month total, and as such largely removes underlying seasonal behaviour. Monthly deaths by area of residence are from the Office for National Statistics (ONS)

https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/datasets/deathsregisteredbyareaofusualresidenceenglandandwales
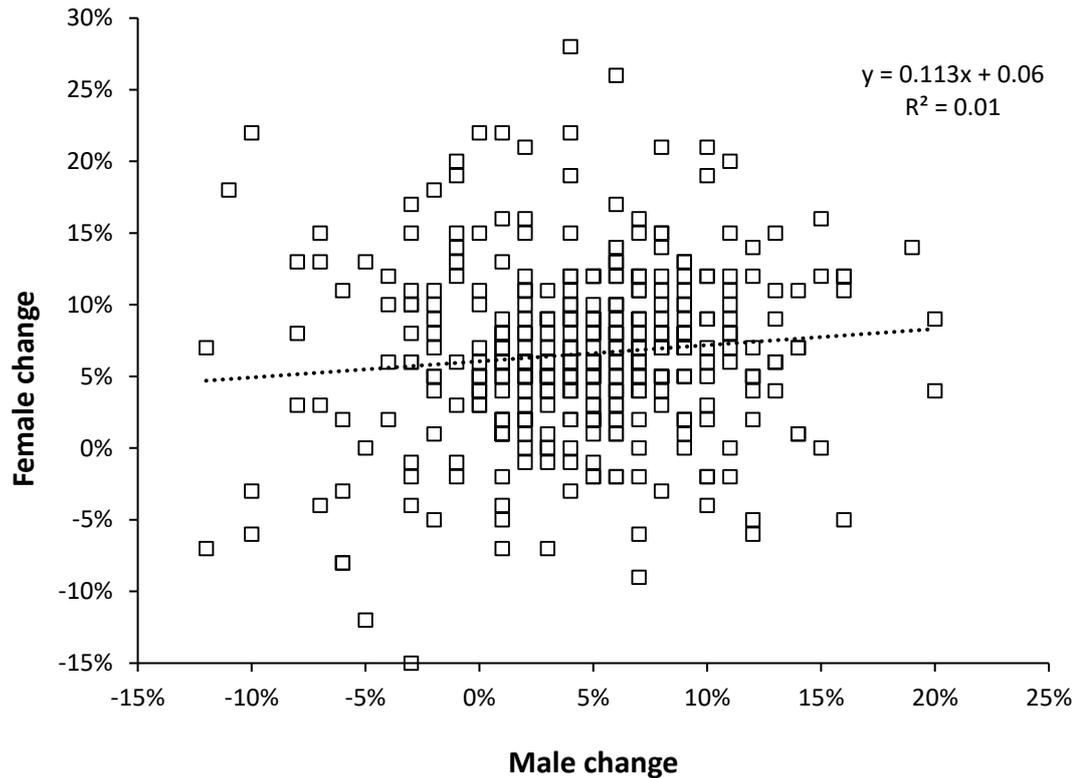
Figure 2. Percentage change in male and female deaths between 2014 and 2015 in English and Welsh local government areas (n=380). The line of best fit is given along with the value of R^2 (p=0 therefore reject the hypothesis).

Footnote: The expected situation would be a line of best fit with slope roughly equal to 1.0 passing through the national average of (6%,5%). To avoid small-number scatter the data excludes any local authority with fewer than 300 male or female deaths (n=19). Annual deaths by area of residence in England and Wales are from the Office for National Statistics, https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulletins/deathsregistrationsummarytables/2015.
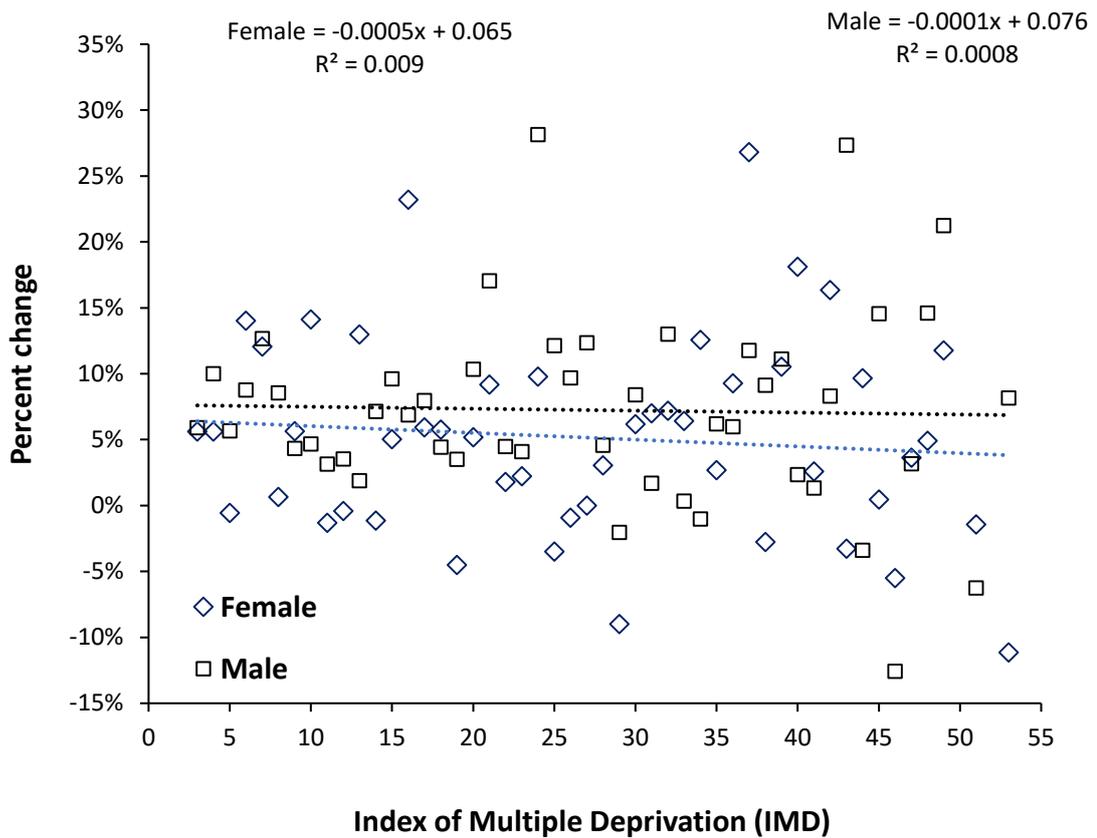
Figure 3. Change in male and female deaths between 2014 and 2015 and the IMD

deprivation score for very small areas in London (n=24,707). Lines of best fit with

associated R^2 (p=0, therefore reject the hypothesis).

Footnote: If austerity were the principle driving force both lines should show an upward slope with a far higher R^2. Deprivation score (IMD) for output areas in London were calculated using the method outlined in Beeknoo and Jones [18]. In 2015 output areas in London contained 336 persons (median), interquartile range (283-394 persons). IMD was rounded to the nearest whole number and output area deaths across London were added into each IMD bin. To ensure that each IMD bin contained a minimum of 200 deaths the first bin is for IMD of 3 or lower (least deprived), while the final bin is for any IMD score of 53 or above (most deprived). Between IMD values 6 to 12 there are more than 700 male or female deaths, while the IMD bin 53+ contained more than 400 male or female deaths. Output area deaths were obtained by request from the Office for National Statistics.