

[397 words]

Authors' response

The prospective UK Million Women Study has shown that happiness itself has no *direct* effect on mortality (except insofar as unhappiness makes people do unhealthy things, such as smoking).¹ The widespread but mistaken belief that unhappiness and stress directly cause ill health has come partly from studies that confused cause and effect, as does some of the correspondence²⁻⁴ arising from our article.

Life-threatening poor health can cause unhappiness; so, unhappiness is *associated* with poor health, and hence with increased mortality. We found, however, that unhappiness itself was no longer associated with increased mortality after taking account of previous ill health, smoking, and other lifestyle and socio-economic factors. (Only 73% were asked about strenuous activity, of whom 98% replied;⁴ our adjustment for this, with separate categories for not asked and not replied, made no material difference.)

Women were asked to self-rate their health, happiness, stress, feelings of control, and whether they felt relaxed. About one-sixth said they were generally unhappy. As in other studies, unhappiness was associated with deprivation, smoking, lack of exercise, not living with a partner, and, particularly, with poor health.

Our main analyses included 700,000 women, average age 59 years at entry. During 10 years follow-up 30,000 died. After allowing for any differences already present in health and lifestyle, overall mortality among those generally unhappy was about the same as among those generally happy. This rules out unhappiness itself being a direct cause of any material increase in overall mortality. The same was true for cancer mortality and heart disease mortality, and for stress as well as unhappiness.

The simplest analyses to interpret (Figure) are for the 500,000 women who reported being in good health, without life-threatening illness, when asked about happiness. After fine adjustment for age and other characteristics, the mortality rate ratios show no association with happiness. These strikingly null findings are incompatible with the large effects of happiness on mortality claimed by others.

This conclusion remains valid even though we recorded happiness only once,² and used only a single question³ (which would have been highly predictive of mortality if no allowance had been made for illness causing unhappiness). Also, the findings were similar for those over and under age 60 years at entry.⁴

In contrast, the Figure shows that for something that really is an important cause of death, such as smoking,⁵ one single question can be strongly predictive of overall mortality.

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Figure: UK Million Women Study. Happiness and smoking vs overall mortality
 Fully adjusted rate ratios vs single-question replies on happiness (left) and smoking (right). Happiness is among women reporting good health; smoking analyses exclude ex-smokers. Square sizes show information content; CIs narrower than their square are shown in white.

References

1. Liu B, Floud S, Pirie K, Green J, Peto R, Beral V. Does happiness itself directly affect mortality? The prospective UK Million Women Study. *Lancet* 2016; **387**: 874-81
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5. Pirie K, Peto R, Reeves GK, Green J, Beral V, for the Million Women Study Collaborators. The 21st century hazards of smoking and benefits of stopping: a prospective study of one million women in the UK. *Lancet* 2013; **381**: 133-41.