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DOI:
10.1016/j.metabol.2009.11.009

Document Version
Peer reviewed version

Citation for published version (Harvard):
Phillips, A, Carroll, D, Thomas, G, Gale, CR, Deary, I & Batty, GD 2010, 'The influence of multiple indices of socioeconomic disadvantage across the adult life course on the metabolic syndrome: the Vietnam Experience Study', *Metabolism*, vol. 59, no. 8, pp. 1164-1171. https://doi.org/10.1016/j.metabol.2009.11.009

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The influence of multiple indices of socio-economic disadvantage across the adult life course on the metabolic syndrome: the Vietnam Experience Study.

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Acknowledgements

The Medical Research Council (MRC) Social and Public Health Sciences Unit receives funding from the UK MRC and the Chief Scientist Office at the Scottish Government Health Directorates. The Centre for Cognitive Ageing and Cognitive Epidemiology is supported by the Biotechnology and Biological Sciences Research Council, the Engineering and Physical Sciences Research Council, the Economic and Social Research Council, the Medical Research Council, and the University of Edinburgh as part of the cross-council Lifelong Health and Wellbeing initiative. David Batty is a Wellcome Trust Career Development Fellow (WBS U.1300.00.006.00012.01).

Conflicts of interest

The authors have no conflicts of interest.

Ethical Approval

Ethical approval for the study was given by various bodies, including the US Centers for Disease Control.

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Abstract

Background: Few studies have explored the relationship between individual and combined multiple indicators of socio-economic status across the life course and the metabolic syndrome, or attempted to understand the mechanisms underlying any associations. The present study examined the associations between four indicators of socio-economic status, individually and in combination, and metabolic syndrome risk in a study of male US veterans, and examined the influence of health behaviours, intelligence, and psychological distress on these associations.

Methods: Participants (N = 4253) were drawn from the Vietnam Experience Study. From military service files, telephone interviews, and a medical examination, occupational, socio-demographic, health behaviour, intelligence, psychological, and health data were collected. The four indices of socio-economic status were: education achieved, early adulthood income, household income in midlife, and occupational prestige in midlife. Metabolic syndrome was diagnosed from: body mass index; fasting blood glucose or a diagnosis of diabetes; blood pressure, a diagnosis of hypertension, or taking anti-hypertensives; high density lipoprotein cholesterol; and triglyceride levels.

Results: In models that adjusted for age, men in the lower two groups on the combined measure of socio-economic status experienced a higher risk of metabolic syndrome. This association was accounted for mainly by education achieved, household income in midlife, and occupational prestige in midlife. Intelligence appeared to explain much of this association.

Conclusions: Combined socio-economic status measures across the life course were related to metabolic syndrome but in a threshold rather than dose-response manner. Intelligence appeared to mediate this relationship.

Key words: health behaviours, intelligence, metabolic syndrome, psychological distress, socio-economic status, veterans.

Abbreviations: HDL high density lipoprotein, SES socio-economic status

Metabolic syndrome is a cluster of symptoms (obesity, high triglyceride levels, low levels of HDL cholesterol, raised blood pressure, and high levels of fasting blood glucose or a diagnosis of diabetes), that increases the risk of cardiovascular, and all-cause mortality [1]. Those with socio-economic disadvantages have been reported to exhibit an elevated risk of metabolic syndrome compared to those in higher socio-economic groups [2, 3].

The bulk of the research on socio-economic status and metabolic syndrome risk has either relied on single indices of socio-economic status, such as education [4] or occupational grade [2], or, where multiple indices have been available, has examined the risk associated with these separately [5, 6]. The observed associations between different indices of socio-economic status and metabolic syndrome suggest that the greatest risk will be borne by those with a combination of disadvantages, such as brief education, low occupational status, and low income, but, importantly, this supposition remains largely untested. Similarly, many studies have only measured socio-economic status indicators at one particular point in the adult life course. It has been suggested previously that accumulated wealth, as an index of socio-economic advantage across the life course, may be a stronger (in terms of magnitude) predictor of metabolic syndrome than measures that reflect socio-economic status at a single time point [7]. Further, the presence of risk factors for cardiovascular disease and/or insulin resistance relates not only to current socio-economic status, but also to prior socio-economic circumstances [8, 9]. Indeed, the importance of an accumulation of indices of poor socio-economic circumstances throughout the life course has been emphasised in relation to mortality [10-12]. Thus, it is conceivable that an index incorporating various sources of socio-economic deprivation at various times throughout the life course might predict metabolic syndrome more strongly than individual indices, and that the more indices of deprivation an individual possesses, the greater the association with metabolic syndrome, in a dose-response manner.

Various characteristics of individual persons might contribute to explaining why low socio-economic status may increase the risk of metabolic syndrome. For example, those in lower socio-economic groups are more likely to engage in certain unhealthy behaviours such as smoking, low physical activity, and poor diet, which correlate with obesity, high blood pressure, and a poor lipid profile [13]. There is a suggestion that controlling for these factors appear to explain some of the association between low socio-economic position and metabolic syndrome risk [6, 14]. Unhealthy behaviours may be particularly important risk factors for metabolic syndrome in men [5, 15], although others have failed to observe an attenuation of the link between socio-economic status and metabolic syndrome risk when adjusting for health behaviours [2]. That controlling for such behavioural risk factors apparently fails to completely eliminate the socio-economic status-metabolic syndrome link raises the possibility that there are other, as yet unmeasured, mediators.

One possible candidate is intelligence or cognitive function (denoted here as IQ). IQ is correlated with socio-economic position, especially education indices [16], is associated with the prevalence of metabolic syndrome [17], and partially mediates the association between low socio-economic position and a range of health outcomes including cardiovascular mortality [16]. Psychological distress may be another factor accounting for the link between socio-economic status and metabolic syndrome. Variations in depression and depressive symptomatology with socio-economic status [18] are well documented, with greater prevalence of depression among the socio-economically disadvantaged. Further, various indices of psychological distress have been shown to relate to metabolic syndrome risk [19]. However, to our knowledge, this is first examination of the effects of IQ and psychological distress as potential explanatory factors in the socio-economic status and metabolic syndrome link.

Consequently, the present analyses aimed to examine the links between socio-economic status and metabolic syndrome in male Vietnam war-era veterans in a novel way through using a combined socio-economic status index derived from several measures gathered pre-, during, and post-service, from late adolescence through to middle age. It also examined the links between the metabolic syndrome and these socio-economic status measures individually. It was hypothesised that the risk for metabolic syndrome would be graded according to one's place on a scale of overall socio-economic adversity accumulated over time. Secondly, given that socio-economic status may impact upon the development of metabolic syndrome in men via various pathways including poor health habits, intelligence, or psychological distress; in combined and separate analyses we considered the extent to which the link between socio-economic status and metabolic syndrome can be explained by such factors in addition to other demographic and service-related variables (e.g. place of service).

Method

Figure 1 details the sampling at each stage of data collection. Ethical approval for the study protocol was given by the US Office for Technology Assessment; the Department of Health and Human Sciences Advisory Committee; the Agent Orange Working Group Science Panel; and a review panel from the US Centers for Disease Control, and informed consent was obtained from all participants. Inclusion criteria were: entered military service between January 1, 1965 and December 31, 1971; served only one term of enlistment; served at least 16 weeks of active duty; earned a military specialty other than "trainee" or "duty soldier"; had a military pay grade at discharge no higher than sergeant. These inclusion criteria were used to ensure that the sample included front line soldiers rather than higher ranking officers as anecdotal reports of health problems had occurred amongst infantry men, whose combat exposure was likely to be more intense than that of the officers. Information on military rank, place of service, and ethnicity was extracted from the military archives in 1983. Ethnic origin was classified as 'white', 'black', or 'other'; the latter group comprising Hispanics, Asians, Pacific Islanders, American Indians, and Alaskan Natives. Based on military rank at discharge from the army (mean age 22.5 yr., range: 17.9 to 36.8), the monthly income of the army personnel based on 1964 pay scales was derived (≤$144 p/m; >$144 p/m), and used as an indicator of early adulthood income. From the subsequent telephone survey, household income in midlife (≤$20,000; >$20,000 per year) and grade from which participants left school (≤12th grade; >12th grade) were determined, and an index of occupational prestige (≤50th percentile; >50th percentile) using the Occupational Classification Scheme.[20] Frequency of alcohol consumption (units per week), cigarette smoking habits, marital status and physician-diagnosed diseases were ascertained using standard questions [21]. The final analytic sample size was 4253. This group represents 23% of persons originally enrolled in the study. Although this analytical sample is based on the recruitment of a random sample of surviving men, concerns about selection bias are nonetheless possible; that is, if the reported results differ markedly between persons included in the analyses and those not. Differences between the excluded and included participants were in fact very small: in comparison to the excluded group, men in the analytical sample had higher IQ test scores (means of 101.3 versus 100.4, p = .001) and a greater proportion had service experience in Vietnam (55% versus 51%, p < .001). The fact that these marginal differences reached statistical significance can be ascribed to the large sample size.

Mean age at medical examination was 38.3 yr. (range: 31.1 to 49.0). Participants fasted from 7 pm on the evening before the examination until blood was drawn the following morning. Serum triglycerides and cholesterol fractions were assessed by an enzymatic method that used an Eastman Kodak cholesterol kit and employed the Ektachem test method. HDL cholesterol was measured after dextran sulphate magnesium chloride precipitation of apo B-containing lower density lipoproteins using a Kodak Ektachem 700 autoanalyzer and Kodak clinical chemistry slides. Triglycerides were also measured using Kodak Ektachem test kits and an enzymatic method. Serum glucose level was determined with an adaptation of the glucose oxidase-peroxidase-chromogen-coupled system, also using Kodak Ektachem 700 autoanalyzer. All laboratory assays the assays were conducted between June 1985 and September 1986 on the day the specimen was collected by Loveless Medical Foundation in Albuquerque under contract from and supervision by the Centers for Disease Control. The assays were assured by using bench and blind repeat controls. The blind repeat tests were run for 667 randomly chosen samples; the intra-class correlations between first and repeat samples were 0.98 for HDL and 0.99 for triglycerides. Overall, bench controls yielded coefficients of variation that were all < 10%.[21]

Following blood sampling, blood pressure was measured twice in the right arm using a sphygmomanometer and an average computed. Resting pulse rate, an indicator of cardio-respiratory fitness and therefore a proxy for regular physical activity [22], was also recorded. Height and weight were then measured to calculate body mass index (BMI, kg/m^2).

After the physiological measures were taken, psychological morbidity was assessed using the Diagnostic Interview Schedule (version 3A)[23] as administered by a trained psychological technician. Study participants were considered positive for Generalised Anxiety Disorder (GAD) and Major Depressive Disorder (MDD) if they reported a pattern of symptoms in the previous 12 months that satisfied Diagnostic and Statistical Manual (DSM) III criteria [24]. In the same session, the Army General Technical Test, which consists of consists of two subtests, verbal and arithmetic reasoning [17] was administered in order to assess cognitive ability (hereafter referred to as “IQ”). IQ scores were standardized to z-scores for ease of interpretation.

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Metabolic syndrome was defined as having at least three of: body mass index (BMI) > 30 kg/m^2 (in the absence of waist circumference data, BMI at this threshold is regarded by World Health Organization as an acceptable substitute in defining metabolic syndrome); triglycerides ≥ 1.7 mmol/l (150 mg/dl); HDL cholesterol < 1.036 mmol/l (40 mg/dl); blood pressure ≥ 130/85 mmHg or a diagnosis of hypertension or taking antihypertensive medication; fasting glucose ≥ 5.6 mmol/l (100 mg/dl) or a diagnosis of diabetes.

[Insert Figure 1 about here]

Demographic, service, health behaviour, metabolic, and haemodynamic variables were compared between those with and without metabolic syndrome using χ^2 and ANOVAs. The binary indices of socio-economic status (early adulthood income; education grade achieved; household income in midlife; occupational prestige) were coded such that lower status was assigned a score of zero, and higher status a score of one. These variables were then summed to form an index of socio-economic status scored from 0-4, thus creating five groups where higher scores indicate higher status. First, logistic regression was used to examine the relationship between the socio-economic status index and metabolic syndrome, in a model adjusting for age alone, and then in separate models adjusting for other covariates (place of service, ethnicity, marital status), health behaviours (alcohol consumption, smoking, and pulse rate as a proxy for physical activity), IQ, and finally, psychological distress (diagnoses of major depressive disorder, generalized anxiety disorder, post-traumatic stress disorder). Second, in order to examine which aspect of socio-economic status was contributing to metabolic syndrome risk, separate age-adjusted analyses were run for each of the original binary socio-economic status variables. These models were repeated with similar separate adjustment as above.

Results

Five hundred and eighty-four (14%) of the 4253 men in the analytical sample were identified as having metabolic syndrome. The demographic, health behaviour, service-related, metabolic, and haemodynamic characteristics of those with and without metabolic syndrome are presented in Table 1. Study participants with metabolic syndrome were slightly older, were less likely to be divorced, widowed or separated, more likely to come from ethnic groups other than white or black, had somewhat higher pulse rates, a lower IQ, and a higher prevalence of GAD.

[Insert Table 1 about here]

As would be expected, the four socio-economic status indices were significantly inter-correlated (*C*s ranged from .17 to .35, $p < .001$).

Combined socio-economic status analyses

Age-adjusted logistic regressions showed that the combined life course socio-economic status score was significantly negatively associated with metabolic syndrome overall, such that those in the lower two status groups (scoring 0 or 1) had an increased risk of the metabolic syndrome in comparison to the highest status group (scoring 4). Those in the higher socio-economic status groups, scoring 2 or 3 on the combined measure, did not differ significantly from the highest status group (scoring 4) in terms of their risk of metabolic syndrome. The outcomes of the age-adjusted analyses for each comparison are shown in Table 2. Following adjustment for demographic and service-related variables, it was again men in the lower two socio-economic status groups who experienced the highest risk of the metabolic syndrome. In this model, ethnicity ($p = .03$) and marital status ($p = .001$) were also significantly associated with metabolic syndrome, such that those of 'other' ethnicity and married were at greater risk. However, it is difficult to pinpoint which of the minority ethnic groups is driving the overall effect of ethnicity, and the ethnicity and marital status effects were unable to attenuate the associations between socio-economic status and metabolic syndrome.

Adjustment for potential explanatory factors

Models C, D, and E sought to identify whether particular covariates might explain some of this association. In model C, health behaviours somewhat attenuated the previous age-adjusted associations with metabolic syndrome, but the prevalence of the metabolic syndrome was still elevated in the lowest status group. In this model, higher pulse rate, as a marker of cardio-respiratory fitness, was significantly associated with metabolic syndrome ($p < .001$). The addition of IQ to the age-adjusted model (see model D) attenuated all previous associations to non-significance (see Table 2). IQ was negatively associated with metabolic syndrome prevalence ($p = .02$). However, psychological distress, as entered in model E, did not attenuate the previous associations shown for the lower two socio-economic groups, although a diagnosis of GAD was significantly related to increased metabolic syndrome risk ($p = .01$) as reported previously [19].

[Insert Table 2 about here]

Individual socio-economic status indicator analyses

In separate age-adjusted models for each socio-economic status variable, early adulthood income was not associated with metabolic syndrome. However, those with less education, lower occupational prestige, and smaller household incomes in midlife, were at increased risk, and remained so in the models adjusting for other demographic and service-related variables. Household income in midlife appeared to be the weakest of the three significant predictors, and occupational prestige in midlife, the strongest. When health behaviours were added to the models, these significant associations with metabolic syndrome were marginally attenuated but remained significant. In model D, the addition of IQ attenuated all of the associations to non-significance, with the exception of occupational prestige which remained marginally significant. With the addition of psychological distress in model E, the previous socio-economic status associations re-emerged.

Discussion

A combined socio-economic status score derived from army income, education, household income in midlife and occupational prestige was significantly associated with the occurrence of metabolic syndrome, such that those at the two lowest levels of socio-economic status were at increased risk of metabolic syndrome in comparison to those at the highest level. These associations appeared to be generated by the contributions of lower educational attainment, smaller household incomes in midlife, and lower occupational prestige. The negative relationship between socio-economic status and metabolic syndrome in the male veterans were still evident after adjustment for other potential confounding variables (with the exception of IQ), a result which contrasts with some previous reports of robust associations only found in women [25-27]. The relationship with metabolic syndrome did appear to be graded by socio-economic status score as reflected in the size of the odds ratios, but there also appeared to be a threshold of deprivation such that a significantly increased risk of the metabolic syndrome was only observed in the lowest two socio-economic groups, i.e. those with lower than 12th grade education, and lower than the median household income in midlife and poor occupational prestige, or those who only scored above the median on one of these indices or had education beyond 12th grade only. It is possible, that after one has accumulated a certain number of socio-economic disadvantages and their health sequelae, any further accretion cannot add to the health burden. Alternatively, the initial speculation regarding a graded association was based on associations with mortality, but it may be that with different morbidities, there are threshold effects, such as observed here, which contribute to an overall graded association with mortality. However, it should be conceded, that although this is mathematically feasible, it remains to be demonstrated that a socio-economic threshold effect characterizes other morbidities.

The absence of an individual effect for early adulthood income seems to suggest that income later in life may be more important than income earlier on, although the other earlier life index, education, was significantly inversely associated with metabolic syndrome risk. A study directly comparing socio-economic status indicators from different life phases found that when both adult and childhood socio-economic indices were considered together, only adult socio-economic status was related to metabolic syndrome [15]. Further, household wealth accumulated throughout the life course has been shown to predict metabolic syndrome over and above childhood indicators of socio-economic status, including education [7]. In contrast, others have argued that metabolic syndrome risk can stem, in the large part, from the influence of early and continuing disadvantage throughout life [28]. For example, in one study, the association between adult social class and metabolic syndrome was mainly accounted for by childhood social class, indexed through parental occupation and education, although only for women [28]. However, it is possible that certain early life indices of socio-economic status may be more pervasive than others, perhaps dependent on the social barriers against amelioration later in life. This would fit with the present data where income was measured at two time points, during army service and in midlife, but only income in midlife is significantly associated with metabolic syndrome. Thus it may be that in terms of income, relatively proximal means become more important for health than relatively distal circumstances. However, it is also possible that later measures only supersede earlier ones where these are amenable to improvement, such as household occupational status, amenities [15], and wealth [7]. It is worth noting, see Table 1, that the proportion of individuals in the lower income category decreases between measurement during service and in midlife. In contrast, education is generally completed earlier in life and thus remains constant for most people. On the other hand, it is possible that the effects of earlier socio-economic indicators other than education are more protracted for women than men.

Occupational prestige appeared to be driving much of the association between socio-economic status and metabolic syndrome. This supports the notion that in affluent societies, relative position is as important for health as absolute position [29]. For example, several studies have shown that measures of income distribution predict life expectancy among developed countries and mortality among states in the US to a far greater extent than gross domestic product [30].

Health behaviours, other demographic variables, and psychological distress had only minor effects on the association between the combined index of socio-economic status and metabolic syndrome. Although others have observed the same outcome for health behaviours [2], there are previous reports that the link between socio-economic status and metabolic syndrome was moderated by health behaviours, such as physical activity [6, 15]. In the present study, pulse rate had to serve as a proxy for physical activity. However, pulse rate was significantly negatively associated with metabolic syndrome risk, and in the individual analyses; nevertheless its effect on the association between socio-economic status and metabolic syndrome was trivial. We should concede, in this context, that pulse rate is an imperfect proxy for physical activity. Nevertheless, not all studies with more direct assessment of physical activity have found that it attenuates the association between socio-economic status and metabolic syndrome [2]. Nonetheless, future investigations would benefit from more direct and comprehensive assessment of health behaviours and include factors such as diet and sleep. Psychological distress has been mooted as a possible mediator of the associations between socio-economic status and health outcomes [31]. Although it is clear that psychological distress is linked to health outcomes such as metabolic syndrome [19], it would not appear to mediate its present association with socio-economic status.

IQ attenuated the associations between socio-economic status and metabolic syndrome. This was perhaps unsurprising, given the strong relationship between IQ and health outcomes [17] and socio-economic status [32]. As such, this study provides further evidence that IQ strongly contributes to socio-economic inequalities in health. Given that IQ tests capture general learning and reasoning ability and are stable over time, it is possible that IQ partially although not wholly mediates the effect of socio-economic status on health outcomes, possibly via a lowered ability to successfully manage one's own health [17]. Given that the correlation between IQ and the indicator of socio-economic exposure herein, and in other cohorts, is not perfect, it is unlikely that IQ is an indicator of socioeconomic position. For a fuller discussion of these issues, please see a previous paper [32].

The present study is not without limitations. Not all of the socio-economic indices were gathered prior to the assessment of the components of metabolic syndrome. Nevertheless, the present study can boast a range of socio-economic status indices at different points in the life course. Second, this raises the issue of reverse causality between ill-health (metabolic syndrome) and lower socio-economic status. However, in this particular sample, those already ill would not have been drafted into army service, hence it is unlikely that ill-health led to a downward drift in socio-economic status. Further, as mentioned above, it was not possible to measure all potential explanatory variables including cardio-respiratory fitness, and other important factors such as inflammatory markers. However, these analyses considered a variety of potentially important mediators including IQ, psychological distress, and health behaviours. Finally, as the sample was exclusively male, there is the issue of generalisation. However, middle-aged men are an important constituency in this context given that they have a higher prevalence of metabolic syndrome than middle-aged women [33]. Similarly, when data on metabolic syndrome were collected, the men were relatively young. It is possible that with the increased risk of metabolic syndrome with age [34], and the pervasive effects of socio-economic status, stronger associations would be evident if such data were gathered in an older sample. However, it should be acknowledged that others have demonstrated no influence of the individual components of education and income in older men [35], while in other studies with a greater age range, associations between socio-economic status and the metabolic syndrome have survived correction for age [2].

In conclusion, male army veterans with three or more indications of unfavourable socio-economic circumstances are at an increased risk of developing metabolic syndrome in middle age, regardless of health behaviours and psychological distress. This suggests that interventions should pay particular heed to those with multiple indices of disadvantage. Finally, differences in IQ account for much of the association between socio-economic status and metabolic syndrome; it is possible that socio-economic status may, in part, be a proxy for cognitive ability, which *per se* has major implications for health.

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FIGURE 1: Sampling in the Vietnam study

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TABLE 1. Descriptive characteristics of those with and without metabolic syndrome.

	Metabolic syndrome (N = 584)		No metabolic syndrome (N = 3669)		*p-value*
	Mean	SD	Mean	SD	
Metabolic Syndrome components:					
BMI (kg/m^2)	30.7	4.14	25.17	3.04	<.001
Triglycerides (mg/dL / mmol/l)	228.2 / 2.6	216.12 / 2.43	97.0 / 1.1	65.04 / 0.73	<.001
HDL cholesterol (mg/dL / mmol/l)	34.8 / 0.9	8.16 / 0.21	46.3 / 1.19	12.28 / 0.31	<.001
SBP (mmHg)	133.3	12.50	121.3	11.10	<.001
DBP (mmHg)	91.9	9.35	82.9	8.84	<.001
Blood glucose (mg/dL / mmol/l)	106.8 / 5.9	30.78 / 1.71	92.3 / 5.1	12.58 / 0.70	<.001
Covariates:					
Age at medical examination (years)	38.8	2.52	38.3	2.51	<.001
Units of alcohol per week	7.3	16.78	7.0	14.01	.71
Pulse rate (bpm) as index of physical activity	86.4	12.20	80.5	12.00	<.001
Standardised IQ score from medical exam	103.5	20.36	106.6	20.33	<.001

		Metabolic syndrome N (%)	No metabolic syndrome N (%)	*p*
Metabolic Syndrome components:				
Obese		346 (59)	203 (6)	<.001
Hypertension Diagnosis		435 (74)	646 (18)	<.001
Diabetes Diagnosis		333 (57)	386 (11)	<.001
Predictor variables:				
Education achieved	≤12th grade	312 (53)	1763 (48)	.016
	>12th grade	272 (47)	1906 (52)	
Army rank at discharge (income)	≤$144 p/m	360 (62)	2271 (62)	.907
	≥$145 p/m	224 (38)	1398 (38)	
Household income in midlife	≤$20,000	184 (32)	1016 (28)	.057
	>$20,000	400 (68)	2653 (72)	
Occupational prestige	≤50th percentile	320 (55)	1799 (49)	.010
	>50th percentile	264 (45)	1870 (51)	
Covariates:				
Place of service	Ever in Vietnam	339 (58)	2009 (55)	.33
	Other overseas	142 (24)	952 (26)	
	US only	103 (18)	708 (19)	
Ethnicity:	White	472 (81)	3016 (82)	.030
	Black	61 (10)	434 (12)	
	Other	51 (9)	219 (6)	
Marital Status:	Married	459 (79)	2671 (72)	.005
	Divorced/separated/widowed	78 (13)	687 (19)	
	Never married	6247 (8)	311 (9)	
Smoking status:	Non smoker	147 (25)	938 (26)	.97
	Ex smoker	165 (28)	1042 (28)	
	Current smoker	272 (47)	1689 (46)	
MDD		46 (8)	231 (6)	.15
GAD		77 (13)	333 (9)	.002

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TABLE 2: Analyses of the prediction of metabolic syndrome prevalence by the combined and individual socio-economic status indicators

		OR (95% CI)	*p*	OR (95% CI)	*p*	OR (95% CI)	*p*	OR (95% CI)	*p*	OR (95% CI)	*p*
Model		A		B		C		D		E	
Combined SES index	4 High	1.0 (ref)		1.0 (ref)		1.0 (ref)		1.0 (ref)		1.0 (ref)	
	3	0.97 (0.73, 1.30)	.86	0.99 (0.74, 1.33)	.94	0.95 (0.70, 1.27)	.71	0.92 (0.69, 1.24)	.59	0.98 (0.73, 1.31)	.98
	2	1.14 (0.86, 1.53)	.35	1.17 (0.88, 1.57)	.28	1.13 (0.83, 1.51)	.43	1.03 (0.76, 1.39)	.88	1.14 (0.85, 1.52)	.38
	1	1.42 (1.06, 1.90)	**.02**	1.48 (1.10, 1.99)	**.009**	1.32 (0.98, 1.79)	.07	1.20 (0.87, 1.66)	.27	1.38 (1.03, 1.86)	**.03**
	0	1.54 (1.11, 2.15)	**.01**	1.72 (1.22, 2.41)	**.002**	1.47 (1.05, 2.06)	**.03**	1.25 (0.86, 1.82)	.24	1.48 (1.06, 2.07)	**.02**
Individual Indices	High	1.00 (ref)		1.00 (ref)		1.00 (ref)		1.00 (ref)		1.00 (ref)	
Education	Low	1.30 (1.09, 1.55)	**.004**	1.31 (1.10, 1.56)	**.003**	1.26 (1.05, 1.51)	**.012**	1.14 (0.94, 1.39)	.18	1.28 (1.07, 1.53)	**.007**
Early adulthood income	Low	1.07 (0.89, 1.28)	.48	0.92 (0.76, 1.10)	.35	0.95 (0.79, 1.15)	.60	1.03 (0.86, 1.25)	.73	0.95 (0.79, 1.14)	.56
Household income in midlife	Low	1.27 (1.05, 1.54)	**.01**	1.41 (1.15, 1.72)	**.001**	1.23 (1.01, 1.50)	**.04**	1.15 (0.94, 1.40)	.18	1.23 (1.01, 1.49)	**.04**
Occupational prestige	Low	1.35 (1.13, 1.61)	**.001**	1.35 (1.15, 1.65)	**.001**	1.30 (1.08, 1.56)	**.005**	1.21 (1.00, 1.47)	**.05**	1.32 (1.11, 1.58)	**.002**

Model A – age adjusted
Model B – age + place of service, marital status, ethnicity
Model C – age + health behaviour adjusted
Model D – age + IQ
Model E – age + psychological distress

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