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ABSTRACT

War is considered one of the most intransigent obstacles to development; yet, the long-run effects of war on individual health have rarely been examined in the context of developing countries. Based on unique data recently collected as a pilot follow-up to the Vietnam Longitudinal Survey, this study examines health status of northern Vietnamese war cohorts (those who entered adulthood during the Vietnam War and now represent Vietnam's older-adult population). To ascertain whether and how war impacts old-age physical and mental health, we compare multi-dimensional measures of health among war survivors, including civilians, combatants, noncombatants, and nonveterans involved in militia activities. Multivariate results suggest that despite prolonged exposure to war and trauma, combat and noncombat veterans are not significantly different from their civilian counterparts in terms of self-rated, functional, and mental health in older adult years. That we do not observe war's adverse effects for veterans might be explained by the encompassing extent of war in northern Vietnamese society.

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Some Glimpses from a Recent Survey

War is considered one of the most intransigent obstacles to development; yet, the long-term impacts of war on individual health and wellbeing have rarely been examined in the context of developing countries (Dreze 2000). Vietnam provides a compelling setting to address this research gap. Arguably, no country's 20th-century history has been as defined by war as Vietnam's (Lamb 2003). The country underwent continuous armed conflicts –first against the Japanese in the 1940s, then against the French a decade later, and subsequently against the Americans from 1965 to 1975 in a protracted war widely known as the Vietnam War. Even after North and South Vietnam were reunified in 1975, Vietnam underwent border wars against China and Cambodia until 1979. Since there is a tendency –when enumerating war tolls– for researchers to commonly estimate casualties or, perhaps attend to material costs or infrastructure loss, the vast scale of the Vietnam War has often been conveyed in statistics– the most intense aerial bombing in history, estimated millions of fatalities, and exodus of over a million refugees, to name but a few (Clodfelter 1995; Hirschman et al. 1995). Less appreciated but no less important for postwar recovery and development is the assessment of lingering effects of war among those survivors whose life course trajectories have been shaped by mortality, disability, dislocation, and disrupted family and career paths.

Recent research by economists, suggesting that heavily bombed areas of Vietnam during the Vietnam War are not distinctly disadvantaged in terms of current poverty and economic development, has conjured debates about the extent to which the war continues to impact Vietnam's communities (Miguel and Roland 2006). The long-standing toll of war devastation may be difficult to quantify; yet, even far less has been empirically examined about how Vietnamese men and women who witnessed or fought in the war have fared over the long run with regards to their physical and mental health. Based on unique data recently collected as a pilot follow-up to the Vietnam Longitudinal Survey, this study assesses health profiles of northern Vietnamese war survivors who entered early adulthood during the Vietnam War and now represent Vietnam's older-adult population. To address how war and military experience in early adulthood had long-term effects over the life course, we compare and contrast multidimensional measures of later-life health outcomes among men and women, among veterans and nonveterans, among veterans of diverse military roles, and among nonveterans with or without militia experience. We attempt to ascertain who (e.g., civilians, militias, veterans, combatants) and how (e.g., widowhood, disability, career promotion) war may have impacted in terms of health status in older adulthood.

BACKGROUND

For nearly three decades, a significant research tradition has evolved in the US which utilizes the life course perspective as a theoretical framework for understanding the impact of military participation, particularly service during periods of war, on subsequent life course outcomes, including educational attainment, health status, marital stability, socioeconomic mobility, and criminality (Lundquist 2004; MacLean and Elder 2007; MacLean 2010; Modell

and Haggarty 1991; Sampson and Laub 1996; Settersten 2006; Wilmoth et al. 2010; Xie 1992). The research has shown that the military is an important institution that can reshape one's life course trajectories and that the effects of military service are not always straightforward but tend to vary across pre-service individual characteristics, the timing of military service in the life course, duration of service, historical periods of service, conflicts of participation, and service experiences (e.g., draft status, branch of service, combat roles). Evidence further indicates that the impacts of military service on later-life outcomes are often circuitous and moderated by other life course events.

The literature based on the American context primarily reports that military service was harmful to the health of men in the general population. American veterans tend to have poorer health and more functional disability than nonveterans. Recent studies conducted by epidemiologists reveal that American veterans who served during the Vietnam War exhibit distinctive health profiles and are likely to suffer disproportionately from particular chronic illness in old age (London and Wilmoth 2006). Other research demonstrates that Vietnam-era veterans in the US were prone to functional limitations and had worse self-rated health than nonveterans and that as they aged, functioning and health deteriorated much more rapidly among veterans than among nonveterans (Dobkin and Shabani 2009). Further, re-analyses of the National Vietnam Veterans Readjustment Study indicate significant persistence of post-traumatic stress disorder (PTSD) among American veterans several decades after their tours of duty in Vietnam, with risks related to post-service social supports and life events (Friedman 2004). While information on the long-term effects of war and military service on health is emerging for veterans of the US military, little is known about the analogous population of Vietnamese veterans and civilians in Vietnam, where mobilization for military service was widespread; participation in militia forces was not uncommon; and, active military and civilians from diverse geographic areas and social groups witnessed violence, dislocation, loss of family members and other traumatic events over several decades (Beresford 1988; Merli 2000; Pike 1986). A meaningful exception is a study examining the long-term health consequences of dioxin exposure for Vietnamese veterans, their children and grandchildren (Stone 2007). Nonetheless, more generalized health outcomes in the broader population are needed and have yet to be considered from a theoretical, sociodemographic, public health, or policy standpoint.

Vietnam has been considered one of the most highly mobilized societies in contemporary history (Beresford 1988). First, military service was almost a universal rite of passage for young men in northern Vietnam (formerly North Vietnam) who came of age in the 1960s, 1970s, and 1980s (Teerawichitchainan 2009). The draft law, first introduced in northern Vietnam in 1960, subjected all men ages 18-27 to an annual draft and required draftees to serve in the Vietnam People's Army (VPA) between 2 and 4 years. During the escalation of the Vietnam War, the draft age was shifted to ages 16-45 and the duration of service was extended to an indefinite time frame. In addition to mobilizing young men to the regular armed forces, a substantial proportion of Vietnamese female and male youth were encouraged to participate in the Youth Shock Brigades during wartime. It was estimated that during 1965-1975 approximately 143,000 youth ages 15-20 were inducted into the brigades (Guillemot 2009). While their major roles were to repair and open roadways, to build bridges, and to transport munitions or food for soldiers, it was not uncommon for these youth corps to replace the VPA soldiers during battles. Further, in its effort to stage a "People's War", the government rigorously mobilized northern Vietnamese

civilians to join the paramilitary force (i.e., the militia and self-defense forces). During the 1970s, it was estimated that at least 1.6 million Vietnamese participated in the paramilitary force (Pike 1986). Generally, the militia carried out four missions: to defend local areas; to support the VPA regulars by assuming some combat duties; to maintain local law and order; and, to engage in economic production such as food production or road construction.

Past research has identified a number of mechanisms through which military service in early adulthood could harm health status in older adult years. First, wartime service tends to involve combat exposure, which not only heightens casualty risks but also increases risks for short-term injury and long-term disability, physical and mental problems, and later-life mortality and premature death. In addition to combat, military service can also expose soldiers to conditions that threaten immediate or long-term health, including training accidents, dangerous work assignments, deployment to location with infectious diseases such as malaria, and placement in environment conducive to substance abuse, smoking, or heavy drinking (Wilmoth et al. 2010). Further, another important mechanism through which military service can adversely affect health in the long run is by fostering difficulties in post-service social integration, as evidenced among Vietnam-era veterans of the US army (Frey-Wouters and Laufer 1986).

Consistent with various memoirs written by former Vietnamese soldiers and members of the Youth Shock Brigades, the handful of existing data-based studies suggest that, during the Vietnam War, northern Vietnamese soldiers likely endured dangerous conditions that were life-threatening or could be detrimental to health over the life course. For example, analyses of the Vietnam Longitudinal Survey indicate that mortality rates for young northern Vietnamese men were about 10 times higher during 1965-1975 than normal death rates in an absence of war (Merli 2000). Further, another recent study suggests that nearly half of northern Vietnamese veterans who survived the war and lived through the mid-1990s spent more than seven years serving in the VPA (Teerawichitchainan 2009). Given that many northern Vietnamese soldiers were involved in combat duties and many combatants were sent to central and southern Vietnam where their chances of being exposed to dioxin were significantly heightened (see Bao Ninh 1996 and Dang 2007 for example), it follows that a great number of Vietnamese veterans likely endured prolonged exposure to harmful conditions. While they might have survived the war, their health could have been greatly debilitated due to such conditions and might have been further compromised by Vietnam's relatively limited healthcare technology and deteriorating public health system during the 1980s (Guldner 1995). Wartime service might have also inflicted physical disability among Vietnamese men. Analyses of the 1989 census suggest that 3 percent of population ages 13-64 were considered invalids and male invalids outnumbered female invalids in all adult age groups (Banister 1993: Table 3). The actual number of disabled adult men was likely to be greater because the census's definition of invalids dismissed the disabled who worked full-time, part-time, or looked for work.

While military service, itself, is often found to be damaging to later-life health status, US-based research also indicates that military service can be associated with positive health outcomes in older adulthood –mainly through selection into the military and some effects of service on subsequent life course outcomes (Wilmoth et al. 2010). First, veterans may have better health than nonveterans, at least in early stages of the life course, because the military usually inducts healthy persons for service (i.e., "healthy warrior effect"). Further, intense

physical training and activity during military service tend to affect health status positively and may also encourage veterans to involve in physical activities over their life course. Moreover, studies find that military service can be particularly beneficial for young men from disadvantaged backgrounds because it "knifes off" prior negative influences of the early life course and creates a bridging environment that provides access to educational, training, and healthcare resources during, as well as after, service (Sampson and Laub 1996). These resources can in turn have positive influences on a variety of health-related outcomes over the life course. For example, military service can enhance occupational status and earnings and in turn positively impact marriage and family integration. Relatively high socioeconomic status and successful married life are usually associated with good physical and mental health. A caveat is that these relationships are found to vary by pre-service characteristics of veterans, aspects of military service such as ranks and combat duties, and historical periods of service. Military recruitment policies at certain periods may produce social class bias in military selection whereby members of certain social class backgrounds are more likely to be inducted.

In the context of Vietnam where there was a universal draft, social class bias in military selection was supposed to be reduced substantially because almost all young men were expected to be inducted. Deferment was nonetheless granted occasionally to men who were physically disabled, sole remaining sons, principal household economic providers, select communist party functionaries, highly talented college students, or technicians with special skills. Apart from that nonveterans during the war were likely to be men who were physically or mentally unfit, one may also suspect that some families might have tried to use their social status (e.g. communist party membership) to reduce their sons' chances of going to war, of being assigned to risky deployments, or of serving for a lengthy period of time. However, empirical evidence suggests that during the Vietnam War there was modest positive selection into the military based on parental education – that is, men with better-educated fathers were slightly more likely to be inducted and more likely to experience war casualties than those from lower socioeconomic status (Merli 2000; Teerawichitchainan 2009).

Arguably, northern Vietnam's extensive war efforts may have reshaped the society and its perceptions toward military service (Merli 2000). Perhaps war served to create a new sense of status and nationalist zeal among the higher status groups in society. Additionally, northern Vietnamese men of advantaged social origins might have wanted to serve in the army because of the array of incentives promised by the VPA to its veterans (Van Dyke 1972). For example, the government promised to give preferential recruitment of returning veterans for positions in village administration and membership in the Labor Youth Group, which was considered a stepping stone to leadership in the Communist Party. Further, the government promised to take care of wounded soldiers by mandating that five percent of jobs at each government agency and state factory were to be reserved for disabled veterans. Disabled veterans were also entitled to additional quantities of rationed goods and reduced rates for all forms of transportation. In the absence of competing economic opportunities, military service might have been considered by the northern Vietnamese as instrumental for upward social mobility. It is unclear to what extent the VPA could live up to its promises – whether veterans and their families fully benefited from these incentives schemes, or how equally the benefits were distributed. Yet, because of a renewed sense of patriotism and severely restricted economic opportunities during wartime,

researchers have argued that young people and their families were likely to perceive military service as a viable alternative for economic activities.

To determine whether and to what extent war and military participation in early adulthood shape later-life health outcomes, we consider the historical context of Vietnam and the potential direct and indirect, as well as positive and negative influences of military service on health. We also take into account pre-service characteristics, mid-life and later-life circumstances. We hypothesize that combat veterans will have worse health in older adult years than noncombat veterans and nonveterans. We are mindful that the veteran-nonveteran differentials in later-life health outcomes can be mediated by several factors and circumstances including the "healthy warrior effect"; the likelihood that veterans possessed higher pre-service socioeconomic status; the possibility that veteran status could positively affect life chances in the middle and older adult years; the active participation of some nonveterans in militia activities; and, the possibly debilitating effects of military service and their role in accelerating premature death rates. Our study is expected to provide empirical evidence and to advance the development of cross-cultural life course perspective, particularly as war and military service serve as turning points in the life course and as the linked lives of those related by kinship and across generations are shaped by the disruption of war and the sacrifices and opportunities of military service.

DATA AND METHODS

The analyses presented in this paper are based on survey data from our recent follow-up study to the Vietnam Longitudinal Survey (VLS), which we refer to here as the VLS Health and Aging Pilot Study. The VLS is a large probability survey of 1,855 households and nearly 4,500 adults in Vietnam's northern region of the Red River Delta[1]. Created by Charles Hirschman of the University of Washington in collaboration with Vietnamese researchers from the Institute of Sociology, this multiple-round data collection project began with a baseline survey in 1995 and continued with annual follows-up until 1998. The VLS was carried out in 10 communes in Ha Nam, Nam Dinh, and Ninh Binh provinces located in the heart of the Red River Delta and approximately 60-100 kilometers south of Hanoi. Not only is the VLS study area currently one of Vietnam's most populous regions but it was also widely affected by US bombing campaigns during the Vietnam War.

In collaboration with the original VLS creators, we conducted a pilot survey in June-July 2010 in one of the ten original VLS communes with the goal to understand the long-term effects of conflict exposure and military participation on health and wellbeing of Vietnamese men and women who entered early adulthood during the Vietnam War (i.e., those born in or before 1955 or reaching age 20+ by the time the war was over) and are now approaching older adult years. The questionnaire of our pilot survey was divided into two components. The first component was designed to provide information for constructing life-course based measures of experiences related to military conflicts and current measures of health outcomes, kinship, and social network ties. These measures are constructed to be comparable to those included in the original VLS. The second component of the survey questionnaire was designed to probe the traits of originally

[1] For further information about the VLS sampling strategy, visit http://csde.washington.edu/research/projects/hirschman/vietnam/docs/sample.pdf.

surveyed adults who have died since the 1995 VLS data collection. In particular, we attempted to locate and interview close family members of the decedents about timing and cause of death (e.g., accident, specific illness, old age). Coupled with details gleaned from the previous VLS surveys on military service, family structure, and socioeconomic status, the information about the decedents allow us to descriptively analyze the wartime experience and life course correlates of mortality and survival and in turn, to better understand the attrition issues, and to address potential selection bias common in studies of long-term impacts of war and other pivotal historical events.

Our pilot study commune – located in a rural area of Ninh Binh province – was selected based not only on a number of practical matters such as accessibility and permission from local authorities but also due to the fact that it represents a typical rural community in this region that has undergone rapid economic development during Vietnam's transition from a collective to market economy. The current population of the study commune is 7,260 –a 10-percent increase from 6,591 residents in 1995. Compared to 15 years earlier, residents of the commune have enjoyed a much improved infrastructure, including availability of electricity, clean water, sanitary systems, paved roads, telephones, and a relatively well-equipped community health center. While a majority of the residents are still engaged in agricultural production, our preliminary analyses suggest that households have increasingly relied on remittances from members who moved to cities or industrial zones for non-farm work.

The pilot survey consisted of two phases. First, we attempted to contact and interview 310 men and women age 55 and older in the study commune who had been surveyed in the 1995 baseline VLS. We successfully interviewed 215 of the 310 original respondents (approximately 70 percent). Of the 95 attrition cases, 85 percent died during 1995-2010 and 15 percent moved away from the commune. In the second phase, in order to reach our target sample size of at least 400 respondents, we randomly selected an additional 190 individuals age 55 and above from the local household registration database who had not been interviewed in the 1995 VLS[2]. For both phases combined, we interviewed a total of 405 respondents. In both the first and second phase of the survey, when a respondent was too physically or mentally incapacitated to be interviewed, their spouse, adult children, or siblings who were knowledgeable about the respondent's life history were invited to provide factual information. However, questions related to feelings, emotions, and perceptions were not answered by the proxy. We conducted a total of 19 proxy interviews[3] (4.7 percent of the total sample).

Measurement of dependent variables: To provide a comprehensive overview of health and wellbeing of Vietnamese war survivors, we examine three dimensions of health, including self-rated health, functional health, and mental health. Studies demonstrate that self-rated health is a consistently well-rounded indicator of health status because it not only encompasses the many physical, psychological, and social aspects of one's current health status but also takes into

[2] Based on our fieldwork observations, villagers were very cooperative possibly due to several years of amicable work relationship between our host institution in Vietnam and the community. Refusals to interview were thus very rare. Nonetheless, during the second phase of the survey, there were 6 cases randomly selected from the household registration database whom interviewers were not able to contact after two attempts because they were not home on both visits.

[3] Of 19 cases, 16 were female and age over 70; 18 were nonveteran; and 5 participated in the militia force.

consideration changes in health over time (Benyamini et al. 2009: 345). Additionally, self-assessed health has shown to correlate closely with physician assessments (Ferraro and Farmer 1999). Respondents were asked in our pilot survey to assess whether their current health was very good, good, fair, poor, or very poor. In this study, we measure self-rated health as a dichotomous variable indicating whether the respondent assessed his/her current health status negatively (poor or very poor) or positively (fair, good, or very good). Approximately 48 percent of the sample gave their health status a negative rating.

The second measure of health outcomes concerns functional health. In our pilot survey, measures related to functional health were adapted from the SF-36 health assessment instrument (Ware and Sherbourne 1992) and Katz' assessment of disability in Activities of Daily Living (Katz et al. 1963). The SF-36 instrument has been translated into Vietnamese and has been applied and validated in Vietnamese settings (VanLandingham 2009). Our survey asked respondents whether, at the time of the survey, they could do the following daily activities by themselves: bathing, dressing, using toilet, transferring from one place to another, feeding, visiting neighbors, going shopping, cooking meals, washing clothes, walking 200-300 meters, carrying and lifting a weight of 5 kilograms, crouching and standing up 3 times, and using fingers to grasp an object. Answers ranged from 1(independently), 2 (with some help), to 3 (assistance required). In the present analyses, we measure functional limitation as a dichotomous variable indicating whether the respondent required at least some help from others to do any of the above daily activities[4]. Approximately 24 percent of the sample reported having at least one form of functional limitation.

In addition to the SF-36 instrument used to assess general mental health status, questions regarding mental health in our pilot survey were also adapted from the content of the Composite International Diagnostic Interview (WHO 1997) and the US-based Vietnam Veterans Readjustment Study (Schlenger et al. 1992), which have been widely used to identify war-zone stress and PTSD symptoms. To construct an index of depressive symptoms, we aggregated the answers to six questions, including the extent to which, at the time of survey, respondents felt lack of pep; no energy; tired; unhappy; downhearted and blue; and very down. Possible answers ranged from 1(never), 2 (once or a few times a year), 3 (monthly or almost monthly), 4 (weekly or almost weekly), to 5 (daily or almost daily). The range of values for this index is 5-30. Higher scores suggest greater extent of depressive symptoms. The mean value of the index is 15.69 with a standard deviation of 4.21. In analyses of mental health and self-rated health, we exclude the 19 cases in which proxy interviews were implemented because respondents were too frail physically or mentally to answer the questions by themselves.

Measurement of independent variable: One of the unique features of our survey is the collection of comprehensive information about wartime experiences of all individuals in the sample. This permits construction of an independent variable that captures nuances of direct and

[4] In preliminary analyses, answers to 13 questions regarding functional health were aggregated to form an additive index of functional limitations. Given that a substantial proportion of the sample (76 percent) reported that they could do the daily activities independently, it is more appropriate to operationalize this dependent variable as a dichotomous rather than continuous variable. Nevertheless, our preliminary analyses show that regardless of whether the dependent variable is operationalized as a dichotomous or continuous variable and whether we use binary logistic or ordinary least square regressions, multivariate results are by and large similar with regards to the direction and size of coefficient of each covariate in the models.

indirect involvements of the northern Vietnamese population during the Vietnam War. Corresponding to our fieldwork observations, we argue that recall errors related to wartime experiences are likely minimal because wartime service and events are so significant in the life course that people tend to remember dates and details and figure out the dates of other life events in reference to them. In our analyses, wartime experience is incorporated as a categorical variable indicating whether the respondent was a combat veteran, noncombat veteran, militia nonveteran, or non-militia nonveteran. Combat veterans were defined as individuals who participated in the Vietnam People's Army and reported to have served in combat roles during wartime. Combat veterans account for about 15 percent of the sample. Meanwhile, noncombat veterans or VPA soldiers who did not serve in combat comprised approximately 12 percent of the sample. In our analyses, we included a small number of respondents who were members of the Youth Shock Brigades as veterans (n=7). Two of them reported to have been combatants and thus were considered combat veterans. Nonveterans in our sample were subdivided into two categories based on their involvement in the militia. Militia nonveterans were respondents who were not VPA soldiers but were involved in the paramilitary force. Slightly over one fifth and about 50 percent of the sample were militia nonveterans and non-militia nonveterans respectively.

[Table 1 about here]

The analysis presented in Table 1 describes the extent to which respondents with different wartime experience (as defined by veteran, combat, and militia statuses) encountered varying degrees of wartime traumatic events. One key finding is that veterans and nonveterans differ considerably in the degree of traumatic events they experienced during the Vietnam War. Significantly more veterans than nonveterans in our sample reported to have witnessed atrocities; to have killed another person; to have been exposed to toxic chemicals; and, to have been moderately or severely injured. Among veterans, there was also significant difference between combatants and noncombatants. Combat veterans reportedly underwent a significantly greater exposure to traumatic events than their noncombat counterparts, with an exception for exposure to severe injuries. Further, Table 1 also suggests that nonveterans who participated in the paramilitary force reported slightly higher exposure to stressful events than their non-militia counterparts. We argue that exposure to wartime traumatic events during one's early adulthood may have had lasting impacts on his/her health outcomes in older adult years. Given that individuals with varying wartime experience differed quite significantly in the levels of stressful life events they endured, we hypothesize that the later-life health and wellbeing of combat veterans –be it self-rated health, functional health, or mental health—will have been most adversely affected, followed by the health of noncombat veterans and militia veterans. We expect non-militia nonveterans to be least negatively affected in this regard.

Measurement of control variables: The review of the literature suggests that health status is a function of several demographic, socioeconomic, and lifestyle factors and these factors can in turn mitigate how wartime experience impacts later-life health outcomes. To examine net effects of war on health, we introduce three types of control variables: demographic, socioeconomic, and lifestyle controls in the analyses. First, demographic controls incorporated in our analyses are gender, age, and marital status. Gender is measured as a dichotomous variable indicating whether the respondent is male or female, whereas age is incorporated as a continuous

variable indicating the age of the respondent at the time of survey. Marital status is measured straightforwardly as a dichotomous variable signifying whether the respondent was married or not married (i.e., divorced, widowed, and never-married) at the time of survey. We anticipate respondents who were female, older, and not in a married relationship to be more likely to rate their health status negatively, to report greater functional limitations, and to report more depressive symptoms.

Additionally, our analyses control for various socioeconomic characteristics such as educational attainment, occupational status, financial wellbeing, and Communist Party membership. Level of schooling is incorporated as a categorical variable indicating whether the respondent had primary education or less, lower secondary education, or upper secondary schooling and beyond. Further, Communist Party membership is included as a dichotomous variable indicating whether the respondent was inducted into Vietnam's most powerful political organization. Research in socialist societies demonstrates that access to party membership, particularly during the collectivization period, not only enhanced one's human capital but could also render various forms of social and political capital that could in turn affect one's health and wellbeing in the long run (Van Dyke 1972; Nee 1989). In our analyses, the effects of economic status on health are controlled via two variables: respondents' occupational status and their perception about financial security at the time of survey. We measure occupational status as a dichotomous variable indicating whether the respondent had primarily engaged in the farm or nonfarm sector throughout most of his/her adult life. Further, in lieu of measuring current wealth status, our analysis includes a dichotomous variable indicating whether the respondent felt that their current income adequately met their expenses. We expect northern Vietnamese with higher socioeconomic status (i.e., better educated, member of the Communist Party member, having worked in the nonfarm sector, and greater sense of financial security) to have relatively positive health outcomes in older adult years.

Apart from demographic and socioeconomic controls, we also take into account differentials in lifestyle choices which have been shown to affect one's health and wellbeing. Our analyses incorporate a series of dichotomous variables which measure whether at the time of survey the respondent smoked regularly (regardless whether or not he/she quit smoking at the present); habitually consumed alcohol; physically exercised almost daily; visited family members and socialized with friends at least once a week; and attended community activities at least once a month. We expect smoking and drinking habits to negatively affect health, whereas daily physical exercise should be beneficial for health. Research also indicates that social support resources from family, friends, and community can have positive effects on the health and wellbeing of older adults and can also act as a buffer for life stressors such as exposure to wars and conflicts (Ramos and Wilmoth 2003; Jawad et al. 2009). We are cautious not to suggest a causal pathway, as individuals in poor health may be limited in their ability to engage and socialize with other people, especially non-family members.

RESULTS

Table 2 describes the distribution of dependent and control variables among respondents of different veteran, combat, and militia statuses. A couple of findings stand out for the three

later-life health outcomes. First, considerably higher proportions of nonveterans than veterans gave negative ratings of their health status and reported functional limitations. Fifty and 28 percent of nonveterans reported poor health and functional disabilities, compared to 38 and 14 percent among veterans. There were no significant differences in self-assessed health and functional health between combatants and noncombatants. While militia and non-militia nonveterans did not differ in terms of self-rated health, civilians involved in the militia during wartime demonstrated significantly fewer functional limitations in later adulthood than did their non-militia counterparts. Relatively similar patterns of later-life health can also be observed for our measure of mental health. Results indicate that nonveterans scored significantly higher than veterans on mean index of depressive symptoms, indicating that on average they reported depressive symptoms to a greater extent than veterans. Between-group differences, however, were greater than within-group differences, as there were no significant differences between combat and noncombat veterans or between militia and non-militia nonveterans in the later-life outcomes of mental health.

[Table 2 about here]

Results in Table 2 further suggest that veterans and nonveterans differed quite significantly in their demographic and socioeconomic characteristics and lifestyle choices. First, men comprised 96 and 27 percent of veterans and nonveterans, respectively. While virtually all Vietnamese combatants were male, women who were former VPA soldiers engaged in noncombat rather than combatant roles. Among nonveterans, 40 percent of the militia force was men, whereas men accounted for only 22 percent of non-militia nonveteran population. With regards to age and marital status, while veterans tended to be younger and remained in a married relationship compared to nonveterans, we do not find statistically significant differences in age and marital status between combatants and noncombatants or between militia and non-militia nonveterans.

In addition to differences in demographic attributes, Table 2 indicates that veterans tended to have relatively higher socioeconomic status than nonveterans. For example, veterans were generally better educated than nonveterans. Given that veterans were predominantly male, this likely reflects gender inequality in educational attainment experienced by Vietnamese women from the wartime cohort. While we do not find significant differences in educational attainment between combatants and noncombatants, nonveterans involving in the paramilitary force appeared to have moderately higher education than those without militia experience. Further, results from our study sample show that a significantly higher percentage of veterans were party members as compared to nonveterans. This could be explained by the Communist Party's policies that gave preference to war veterans when it came to inducting new members. Forty percent of combatants were inducted into the Party, compared to 26 percent among noncombatants. There was also a sharp difference between militia and non-militia nonveterans in rates of party membership, with more of the former being inducted into the Communist Party.

We find that veterans appeared to work in the nonfarm sector at a higher proportion than nonveterans. However, there were no significant differences in occupational status between combatants and noncombatants or between militia and non-militia non-veterans. The veteran-nonveteran difference likely echoed the hiring practice in the nonfarm sector (primarily jobs in

government offices or state factories/enterprises) during the collectivization period which, by law, gave a priority to hiring veterans over nonveterans. These nonfarm positions were desirable, and commanded greater in-kind benefits and pensions, as compared to positions in collective farms. Results in Table 2 indicate that even though the difference may not be very statistically robust, veterans and nonveterans differed in their perception about financial security, with a higher proportion of veterans expressing income adequacy.

Not only are veterans and non-veterans different in their pre-service characteristics and mid-life and later-life circumstances, results show that major lifestyle differences were found between veterans and nonveterans rather than within these two groups. Consistent with evidence found among veterans in other contexts, more veterans than nonveterans reported to have smoked and consumed alcohol and to be more physically active. While there was no significant difference between veterans and nonveterans with regards to social interaction with family members, veterans in our sample reported socializing with friends and doing community activities on a regular basis at a higher percentage than nonveterans.

Given that individuals with different veteran, combat, and militia statuses differed quite significantly in their demographic, socioeconomic, and lifestyle characteristics, it is important to take into account these differentials in order to examine the net influences of war and military experience in the early life course on health outcomes in older adult years. To move beyond the detailed descriptive picture of health outcomes, we turn to multivariate analyses to explore mechanisms underlying the observed differences. We take two approaches in our multivariate analyses. First, we use binary logistic regressions to address determinants of self-rated health and functional health. The second approach utilizes ordinary least square regressions to examine determinants of the mental health index. The results of these analyses are shown in Table 3. In the binary logistic regression analyses, the two dependent variables are coded 1 if the respondent gave negative assessment of their health status and if the respondent reported any functional limitations, and correspondingly coded 0 if not. In OLS regression analysis, the dependent variable –index of depressive symptoms—is treated as continuous variable with higher index scores indicating more depressive symptoms. When analyzing each dependent variable, we incorporate two models. First, the baseline model treats trends in each health outcome as a function of war and military experience. Second, the saturated models add demographic, socioeconomic, and lifestyle control variables. Essentially, two key questions are addressed here. First and foremost, to what extent can war and military experience explain differentials in later-life health outcomes, after taking into account various control variables? Second, to what extent are observed health outcomes a result of differences in demographic, socioeconomic, and lifestyle characteristics, net of influences of war and military service?

[Table 3 about here]

In the binary logistic regression analyses, coefficients are expressed as the odds ratios of negative self-rated health and having functional limitation versus positive self-assessed health and having no functional limitations for each category relative to the comparable odds of the reference category for each variable. Odds ratios above 1 indicate that the particular category is associated with higher chances than the reference category that the respondent rated health status negatively, whereas values below 1 indicate the opposite. In the OLS regression analysis, we

present unstandardized coefficients whereby positive coefficients indicate greater depressive symptoms associated with a particular category, while negative coefficients suggest the contrary. Both the binary and OLS regression analyses utilize a similar set of covariates and additive models. The reference categories for both binary logistic and OLS regression analyses are as follows: non-militia nonveteran, female, not married, primary education or less, not a member of the Communist Party, primary work in the farm sector, perception about one's own income inadequacy, never smoking, never consuming alcohol regularly, exercising irregularly, visiting family and socializing with friends less frequent than once a week, and attending community activities less frequent than once a month. Age is included in multivariate analyses as a continuous variable.

All three baseline models in Table 3 demonstrate that there were some significant differences in later-life health outcomes between combat veterans, noncombat veterans, militia nonveterans, and non-militia nonveterans. More specifically, veterans (combatants in particular) were less prone to rate their health status negatively and less likely to report functional limitations and depressive symptoms. However, in the saturated models where control variables were introduced, almost all of the significant differences observed earlier disappeared. The only exception is the independent effect of having served in the militia force on functional limitations. We find that militia nonveterans were less likely than non-militia nonveterans (i.e., civilians) to report functional difficulties. We posit that such a result may reflect positive health selection among militia volunteers, and/or the carryover of positive physical benefits related to training for militia activities. Apart from this, the seemingly later-life health advantages observed among combat and noncombat veterans in the baseline models appear to be explained entirely by differences in demographic, socioeconomic, and lifestyle characteristics of individuals with varying veteran, combat, and militia statuses.

Results in Table 3 show that sense of income adequacy is consistently associated with positive health outcomes in later adulthood. Given other characteristics equal, the likelihood of negative self-assessed health and functional limitations decreases by 57 and 53 percent respectively when the respondent reported income sufficiency at the time of survey. We also find that older adults who felt secure about their financial outlook were significantly less likely to show depressive symptoms. Apart from sense of income adequacy, age is another consistent determinant of health outcomes. As expected, the older the respondent was, the more likely he/she were to rate their health negatively and to report more functional limitations and depressive symptoms. Other demographic characteristics such as gender and marital status do not demonstrate independent effects on self-rated health and functional health but are robust determinants of mental health in older adult years. Consistent with research on aging in other contexts, Vietnamese respondents who were male and were married at the time of survey had significantly less likelihood of reporting depressive symptoms than those who were female and not married. Further, other than income adequacy, education is the only other socioeconomic characteristic that had net impacts on later-life health status. We find that while high education (i.e., upper secondary and tertiary level) is associated with better mental health status in later adulthood, lower secondary education is significantly linked to the increased likelihood of negative self-assessed health relative to those with basic primary education.

Aspects of lifestyle choices stand out as important determinants of health and wellbeing among Vietnamese older adults in our sample. Community involvement consistently shows net positive effects on the three dimensions of later-life health. For example, attending community functions at least once a month decreases the likelihood of negative self-rated health by more than 30 percent. Other lifestyle behaviors such as strong social network ties to family and friends are positively associated with one's functional health in older adult years, whereas regular exercise is significantly related to reduced depressive symptoms. Results show, however, that unhealthy habits such as smoking are associated with greater depressive symptoms.

DISCUSSION

Using a logic developed from life course perspectives and previous research conducted largely among US veterans of the Vietnam War, we hypothesized that northern Vietnamese veterans, especially those who engaged in combat, would exhibit poorer self-assessed, functional and mental health in later adulthood compared to nonveterans. While studies conducted among American veterans frequently identify health disadvantages associated with military service, increased premature death rates, as well as lingering PTSD symptoms decades after service, we observe no such association in our sample of older adults in northern Vietnam. While contrary to expectation, especially given that Vietnamese and American veteran survivors were fighting in "the same war," a war that was long in duration, involved numerous casualties, and placed millions in zones of dangerous conflict, we have arrived at several plausible explanations for the absence of a military service effect on self-assessed, functional, and mental health among Vietnamese older adults.

Our foremost explanation for the insignificant relationship between military service, including participation in combat, and physical and mental health relates to the encompassing nature of war as experienced in northern Vietnamese society. When the health of US veterans (and other frequently studied veterans) is compared to that of their nonveteran counterparts, the comparison is being made to individuals whose lives were not directly impacted by the destruction, dislocation, and upheaval of war. Military service as a dimension of experience and stage in the life course may be less salient for health status in later adulthood when war's physical devastation, as experienced through bombing campaigns, forced migration, shortages of food, and other disruptions, impacts not only service men and women, but the population overall. It is also important to note that in northern Vietnam the line between soldier and civilian was marked by gradations of service and exposure to war's dangers, as a substantial proportion of nonveterans participated in the militia and self-defense forces. This line of reasoning is consistent with retrospective reports of distress experienced in the wake of wartime trauma among members of our sample. While a smaller fraction of nonveterans than veterans report having witnessed wartime atrocities (29 percent versus 62 percent, respectively, as evidenced in Table 1), we find that these nonveterans are actually significantly more likely to report having experienced distress or severe distress associated with such events as compared to veterans in the sample (see Figure 1). While an elaborate discussion of traumatic event exposure and perception is beyond the scope of this paper, it is clear from this preliminary result that veterans and nonveterans alike endured traumatic events as a result of war and that members of both groups experienced immediate and lingering distress as a result of such exposure.

[Figure 1 about here]

The second explanation for the absence of an effect of military service on health in older adulthood relates to the notion that "time heals." Especially with respect to emotional health and cognitive functioning, veterans (and others) who endured injury, trauma, or other hardships related to war, may have seen their symptoms dissipate with the passage of time. Especially since the end of war did not mark the end of social upheaval for northern Vietnamese, it is quite possible that subsequent, broad-based social change, related, for instance, to the consolidation and collectivization of northern and southern Vietnamese economy and then the unfurling of market reforms, also weighed negatively on population health (Guldner 1995; World Bank 2001). If Vietnamese veterans, who were more likely than nonveterans to have come from a relatively high-status group prior to be inducted into the military, were relatively well protected during these periods, such as through more secure economic status or the provision of health insurance, then any negative health impacts associated with veteran status in the immediate aftermath of war may have been "washed out" over the course of time, especially since civilians may not have received the benefits afforded to veterans during the difficulties of the collectivization period (e.g., rationing). Additionally, previous research conducted among Vietnamese refugees in Australia has found that, indeed, the passage of time is associated with weaker levels of functional difficulty and psychiatric symptoms among those who experienced trauma (Steel et al. 2002). Poor mental health outcomes became weaker the longer the duration of time since the experience of traumatic events. Nevertheless, for those who experienced multiple traumas (i.e., traumatic events in three or more categories on the Harvard Trauma Scale), persistent mental health effects were reported over ten years later, pointing to the importance of focusing on those most traumatized, be they veterans or civilians, to understand the lingering effects of wartime trauma and its treatment. Given these preliminary results we intend to explore in our future work traumatic experience related to war and current mental health outcomes within a wider sample of Vietnamese older adults, veterans and nonveterans alike.

Third, when the ill-effects of war on health and other aspects of wellbeing are examined among the US veteran population, mention is often made to the poor reception that greeted veterans of that war when they reentered society. This absence of a "hero's welcome" perception, while it may not have generalized to all US veterans across all contexts, may undermine health and healing (Frey-Wouters and Laufer 1987). Compared to their American and southern Vietnamese counterparts, northern Vietnamese veterans of the VPA were afforded relatively positive treatment and status in the society, as were their family members (e.g., education benefits to veterans; awards to "heroic mothers" whose children died in service) (Ho Tai 2001). Due to nationalist fervor, military participation in the war was widely regarded in northern Vietnam as a patriotic act. After the war years, the socialist government reinforced such notions through various social programs implemented by the Ministry of Labor, Invalids, and Social Affairs (MOLISA), to ensure the protection and welfare of "war invalids." Veterans of the VPA are also eligible for early pension benefits and health benefits that exceed the coverage commonly available in the general population (Bureau of International Affairs 2002). The accrual of such benefits to veterans following wartime service may account for their relatively favorable later-life health as compared to nonveterans.

Aside from the results related to our main hypotheses, we observe several significant predictors of older adult health status that warrant elaboration. Among the most prominent predictors in our three models is income adequacy, which exhibits a significant, positive association with self-reported health and a significant, negative association with depressive symptoms. Those reporting income inadequacy, a full 33 percent of the sample, are likely to experience both structural barriers to accessing adequate care in the face of illness and/or disability, as well as emotional difficulties, such as worries about making ends meet or feelings of marginalization. Both sets of factors, and others, serve as potential mechanisms linking socioeconomic position and health status. The strongly negative association between income adequacy and health raises important questions as to the adequacy of old-age safety nets in Vietnam as the country has moved away from its socialist elements. The sizable segment of older adults who report feeling insecure about their income situation does not bode well for population health in an aging Vietnam.

Measures of social relationships and social participation also emerge as significant, positive correlates with all three dimensions of older adult health. While much research on older adult health and wellbeing emphasizes family supports, our research points to the significance of ties to family as well as friendship ties and community involvement. The cross-sectional design of the current study prohibits definitive theorizing on the direction of the relationship. However, we suspect that the positive relationship between social capital and health is reciprocal, with good health and social connectedness reinforcing one another. Further analyses that utilize a longitudinal perspective and more detailed measures of social network ties would be beneficial for teasing apart this relationship. These preliminary results are telling, however, particularly in the context of rapid urbanization and the implications that urbanization, rural-urban migration, and market-economic development may have on rural adults' social network ties and relationships.

The current study has several limitations that influence the nature and certainty of our conclusions. A chronic problem in studies of aging and health relates to mortality selection. Our inspection of lifetime military service and follow-up between the 1995 VLS and the 2010 Aging and Health Pilot Study reveals that veterans were actually more likely than nonveterans to survive over this 15 year period than nonveterans (not shown). Yet, the relationship between military service and health status in later adulthood may be impacted by the greater odds of dying prior to the initial VLS data collection among the subset of veterans whose health was most negatively impacted by wartime service. As a result, by 2010 we are likely only to observe the relatively resilient veterans, or those who did not sustain injuries/illnesses that threatened their lives in the immediate aftermath of war. Thus, the true strength and direction of the relationship between military service and health status is subject to mortality-based selection. Future research that probes family members of individuals who survived the war but who did not live through the time of survey about the decedents' age-, sex-, and cause-specific mortality could assist in pinpointing the nature and direction of biases related to mortality selection.

Other limitations of the current study relate to the exploratory and small-scale nature of the pilot study. We attempt to assess a relationship between health and military service that has been widely investigated in the US and other western, industrial nations, but that has yet to be

studied in contexts such as Vietnam. Our approach has involved adopting concepts and approaches to measurements to a novel context. For instance, the use of Katz and colleagues' measures of activities of daily living (ADLs) is prominent in cross-cultural studies of functional health and limitations in older adulthood. A cursory review of the literature reveals application of the Katz ADL approach to studies of Vietnamese elders living in the US, but few if any studies are found which have used this approach, or validated this instrument, in the context of Vietnam. In moving beyond the pilot study we recognize the importance of exploring and validating various existing instruments for assessing function, mental, cognitive and other dimensions of health. The SF-36, and adaptations thereof which have been implemented in Vietnam, suggest a promising route for moving forward.

The pilot study also features a small sample of just over 400 persons. Hence there is limited variation on several of the dimensions of health, life course, and military service that we wish to investigate. Further study, with a larger sample, will permit investigation of several aspects of service that may impact upon older adult health. For instance, the nature, duration and extent of trauma have shown to have lingering effects on mental health decades after war (e.g., Steel et al. 2001). Additionally, many women fought in the militia and army during the Vietnam War and their unique experiences may distinguish them from other women and from male veterans. These are among the important dimensions of experience, unique to Vietnamese older adults, whose analysis can provide insights for cross-cultural theories of life course, and illuminate military service as a hidden variable in our understanding of aging (Wilmoth et al. 2010).

CONCLUSION

This study provides some glimpses into the history of wartime service among the northern Vietnamese and the relationship between military service in the early life course and various dimensions of health in older adulthood. While military service has been widely examined and theorized as a life-course turning point, previous investigations have concentrated heavily upon US servicemen and women. The long-term consequences of war among Vietnamese survivors are not well understood. As Merli (2000) notes, "the ramifications of this war for *Vietnamese* society are absent from public discourse… [and] social science literature." We therefore aim for the initial results of this pilot study to begin to fill a crucial gap in our understanding of the long-ranging impacts of war. Our focus on the health and wellbeing of northern Vietnamese veterans and nonveterans also broadens the base of understandings about war's consequences and military service in the life course. Comparing and contrasting the cases of US and Vietnamese veterans of the same war is instructive, as their outcomes, vis-à-vis civilian society, are distinct.

Our main finding is that veteran status bears little influence on self-assessed, functional, and mental health in later adulthood. This stands in contrast to several US-based studies which observe distinct health profiles for veterans, including greater rates of chronic illness, premature death rates, and PTSD. In the context of northern Vietnam, not only did mobilization for war define the adolescence and young adulthood of a generation of men and women now reaching older adult years, but the mobilization also encompassed the entire society as "the war effort

enlisted each and every stratum" (Van Dyke 1972). Bombing campaigns and evacuations meant war was experienced very directly by the entire population – be it veterans, civilians, or the substantial proportion of the population engaged in the militia and self-defense forces. Additionally, these shared experiences continued as the war ended victoriously for the northern Vietnamese, yet leaving behind staggering death tolls, devastating costs as a result of infrastructure damages and needs for massive social and economic reorganization. Whether wartime experiences continue to influence older adults' lives is a core question that motivates this study and a broader research agenda around elements of healthy aging in Vietnam. Given that life course researchers have recently described military service as a hidden variable that aids an understanding of aging process in the US (Wilmoth et al. 2010), formal service in the VPA as well as other experiences related to war may also prove important for understanding life course trajectories and wellbeing in later adulthood in Vietnam.

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Table 1. Descriptive statistics, Stressful life events by veteran, combat, and militia statuses.

Stressful life events	Veteran[a]	Non-veteran	Sig.	Veteran			Non-veteran		
				Combat	Non-combat	Sig.	Militia	Non-militia	Sig.
% Witnessing atrocities or mass killings	61.5	29.1	***	75.8	42.6	***	44.4	22.3	***
% Injuring or killing another person	37.6	1.4	***	59.7	8.5	***	4.4	0.0	**
% Being exposed to toxic chemicals	50.5	2.0	***	66.1	29.8	***	4.4	1.0	*
% Being moderately injured[b]	35.8	1.4	***	48.4	19.1	***	4.4	0.0	**
% Being severely injured[c]	22.0	0.3	***	27.4	14.9	n.s.	1.1	0.0	n.s.
Number	109	296		62	47		90	206	

***Difference is significant at p≤0.001; **Significant at p≤0.01; *Significant at p≤0.05; †Significant at p≤0.1; n.s= Not significant p-value.

Source: VLS Health and Aging Pilot Study 2010.

[a] Including a small number of respondents who volunteered in the youth movement that fought in the frontline during the Vietnam War (n=7).

[b] Required time for recovery with or without hospitalization; Not being discharged from duty

[c] Required hospitalization; Being discharged from duty; With or without permanent disability

Table 2. Descriptive statistics, Distribution of dependent and control variables by veteran, combat, and militia statuses.

Background characteristics	Veteran[a]	Non-veteran	Sig.	Veteran			Non-veteran		
				Combat	Non-combat	Sig.	Militia	Non-militia	Sig.
Dependent variables[b]									
Negative self-rated health (%)	38	52	*	40	35	n.s.	52	52	n.s.
Having functional limitations (%)	14	28	**	15	13	n.s.	18	32	**
Mean index score for depressive symptoms (range: 5-30)	14.46	16.17	***	14.7	14.1	n.s.	16.34	16.09	n.s.
Demographic controls									
Male (%)	96	27	***	100	92	*	40	22	***
Age 70+ (%)	21	41	***	23	19	n.s.	43	40	n.s.
Mean age in 2010	63.62	67.63	***	64.85	62.00	*	68.69	67.17	n.s.
Married (%)	91	68	***	89	94	n.s.	69	68	n.s.
Socioeconomic controls									
Level of highest education completed (%)									
Primary or less	18	49	***	19	17	n.s.	39	54	*
Lower secondary	58	41	**	61	53	n.s.	53	35	**
Upper secondary and tertiary	24	10	***	19	30	n.s.	8	11	n.s.
Total	(100)	(100)		(100)	(100)		(100)	(100)	
Communist Party member (%)	34	11	***	40	26	†	22	5	***
Major work in nonfarm sector (%)	32	15	***	31	34	n.s.	12	16	n.s.
Sense of financial security (%)	73	64	†	71	77	n.s.	68	63	n.s.
Lifestyle controls									
Having smoked (%)	79	19	***	82	75	n.s.	28	15	**
Habitually consuming alcohol (%)	78	21	***	77	79	n.s.	26	19	n.s.
Physically exercising almost daily (%)	57	37	***	60	53	n.s.	39	35	n.s.
Visiting family at least weekly (%)	37	42	n.s.	39	34	n.s.	48	40	n.s.
Socializing with friends at least weekly (%)	96	82	***	97	96	n.s.	81	83	n.s.
Attending community activies at least monthly (%)	55	38	**	61	47	n.s.	46	35	†
Number	*109*	*296*		*62*	*47*		*90*	*206*	

***Difference is significant at p≤0.001; **Significant at p≤0.01; *Significant at p≤0.05; †Significant at p≤0.1; n.s= Not significant p-value.

Source: VLS Health and Aging Pilot Study 2010.

[a] Including a small number of respondents who volunteered in the youth movement that fought in the frontline during the Vietnam War (n=7).

[b] For the analyses of self-reported health and mental health status, we exclude 19 cases that used proxy interviews.

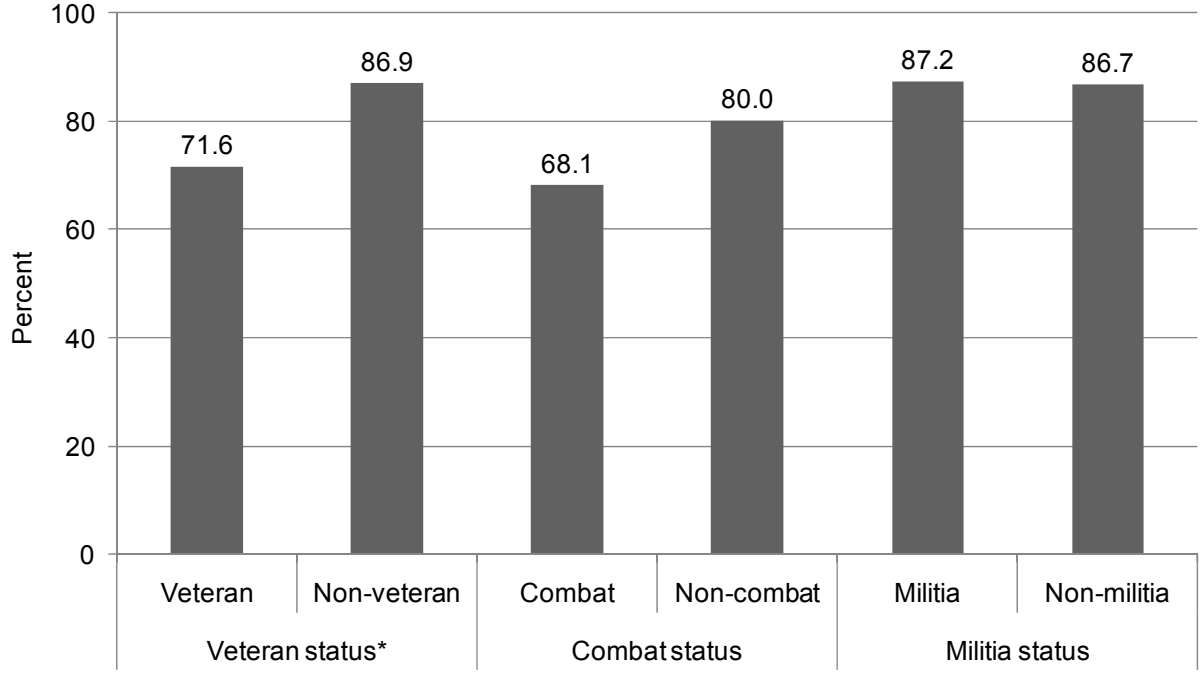
Table 3. Multivariate analyses (Binary logistic and OLS regressions), Determinants of self-rated health, functional health, and mental health.

Covariates	*Binary logistic regression*								*OLS regression*					
	Negative self-reported health				Having functional limitations				Index of depressive symptoms					
	Baseline		Saturated		Baseline		Saturated		Baseline			Saturated		
	Odds ratio	Std. Error	Odds ratio	Std. Error	Odds ratio	Std. Error	Odds ratio	Std. Error	Coef.	Std. Error		Coef.		Std. Error
Constant	--	--	--	--	--	--	--	--	16.093 ***	0.299		14.220 ***		2.167
War experience (non-militia nonvet=ref)														
Combat veteran	0.628 †	0.296	1.102	0.401	0.360 **	0.390	1.204	0.586	-1.367 *	0.607		0.551		0.678
Noncombat veteran	0.496 *	0.341	1.021	0.424	0.310 **	0.462	1.095	0.616	-1.985 **	0.682		0.349		0.706
Militia nonveteran	0.994	0.261	0.971	0.292	0.459 **	0.314	0.442 *	0.396	0.248	0.541		0.513		0.505
Male (female=ref)			0.747	0.440			0.495	0.567				-1.757 *		0.760
Age			1.030 †	0.017			1.109 ***	0.020				0.092 ***		0.028
Currently married (widowed/divorced/single=ref)			0.913	0.294			1.369	0.348				-1.265 **		0.509
Highest education completed (Primary=ref)														
Lower secondary			1.714 †	0.305			0.741	0.375				-0.550		0.516
Upper secondary and tertiary			0.635	0.453			0.378	0.686				-1.608 *		0.743
Communist Party member (nonmember=ref)			1.291	0.357			1.489	0.497				0.295		0.603
Major work in nonfarm sector (farm=ref)			0.819	0.326			1.205	0.452				-0.077		0.553
Sense of income adequacy (inadequate=ref)			0.431 ***	0.246			0.474 *	0.307				-2.110 ***		0.420
Having smoked (never smoke=ref)			0.842	0.379			0.845	0.520				1.041 †		0.648
Habitually consuming alcohol (None/not regularly=ref)			0.723	0.354			0.725	0.474				-0.196		0.607
Exercising almost daily (irregularly=ref)			1.143	0.229			0.753	0.314				-0.998 **		0.390
Visiting family at least weekly (less often=ref)			0.832	0.232			0.392 **	0.317				-0.564		0.394
Socializing with friends at least weekly (less often=ref)			0.635	0.363			0.552 †	0.381				-0.638		0.608
Attending community activities at least monthly (less often=ref)			0.672 †	0.232			0.511 *	0.324				-0.628 **		0.401
Number	386		386		405		405		386			386		

Significance level: ***p≤0.001; **p≤0.01; *p≤0.05; †p≤0.1

Source: VLS Health and Aging Pilot Study 2010.

Figure 1. Percent of respondents having witnessed wartime atrocities who reported to have expereienced distress or severe distress.



***Difference is significant at p≤0.001; **Significant at p≤0.01; *Significant at p≤0.05; † Significant at p≤0.1;

Source: VLS Health and Aging Pilot Study 2010.