

Health Problems of American Women Veterans of the Vietnam War

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Introduction

The use of Agent Orange and other toxic herbicides in Vietnam has been a point of great debate and concern since the US military first used these chemicals in 1962. Many unanswered questions about the long term health and environmental effects these substances have had on civilians and Vietnamese and Allied troops have persisted over the years.

Agent Orange is a powerful defoliant which reacts quickly on vegetation. It was used in Vietnam as a weapon to hinder enemy operations, destroy crops and to protect the perimeters of field installations and outposts. Although 3 major herbicides (and several minor ones) are listed in combined Air Force and Joint Services HERBS files of spray data, public and professional attention has centered on Agent Orange, " a 1:1 mixture of the N-butyl esters of 2,4-dichlorophenoxy acetic acid (2,4-D) and 2,4,5-trichlorophenoxy-acetic acid (2,4,5-T) (Boyle, Decoufle & O'Brien, 1989, p3).

A byproduct contaminant of the manufacturing process for 2,4,5-T is 2,3,7,8-tetrachlorodibenzo-para-dioxin (TCDD) commonly referred to as dioxin. Because there was a large military requirement for Agent Orange, the manufacturing process was accelerated resulting in higher levels of dioxin than in the 2,3,5-T produced for civilian use. It is estimated that the US military used 27 times more herbicide per unit area than most domestic applications which were used to prevent weed overgrowth (McLellan & Morris, 1987).

Approximately 20 million gallons of these herbicides were sprayed over 3.6 million acres of Vietnam from 1962-1971 (McAllister, 1993). From the beginning, manufacturers

attempted to persuade the military that these chemicals were harmless. When spraying operations began, US troops were actually told that these substances were not toxic. (Govier, 1989) This failure to warn troops of the caustic and dangerous nature of these chemicals promoted a lackadaisical attitude about handling it.

Because women were not routinely assigned to duty in the jungles or Agent Orange spray areas, the extent of their contact with the toxic herbicide had traditionally been considered minimal. In reality, the use of Agent Orange was not limited to jungle or combat areas. It was used indiscriminately to clear grass and foliage around hospitals, living quarters and base perimeters. The chemical remnants saturated the clothes and bodies of the casualties, tainted the drinking water and seeped through the earth. Exposure was inescapable.

Methods

This study is a secondary analysis of data collected for the National Vietnam Veterans Readjustment Study (NVVRS). The NVVRS, authorized by Congress in 1983, is a comprehensive study of the mental health status and general life adjustment of Vietnam veterans. The study is of sufficient size and scope to provide accurate national estimates to assess life adjustments of military men and women who served in Vietnam during the war and to compare them to similar "era" and civilian populations.

The main objectives of this analyses was to identify and document significant differences in the self-reported health problems and reproductive outcomes of women in three study cohorts: military women who actually served in Vietnam (THR); military women who served in the military but not in the theater (ERA); and civilian women who never served in the military (CIV). Most relevant to this discussion, a portion of the analysis compared health problems of the women who served in Vietnam to exposure to Agent Orange.

Logistic Regression was used to test binary and dichotomous dependent variables. In the case of continuous variables, multiple regression was the method of choice. Multivariate Analysis offered the best array of descriptive and inferential procedures required in this analysis. Controlling for possible confounding factors was uniformly applied to test the associations of health problems with exposures Agent Orange and other conditions in Vietnam. The primary measure used to assess the magnitude of the association of disease to the three cohorts was the Odds Ratio (OR).

Although there was no direct assessment of exposure to Agent

Although there was no direct assessment of exposure to Agent Orange in the original study, information on dates and locations of assignments in Vietnam presented an opportunity for this analysis to compare these data with records and intelligence reports on the areas where Agent Orange was used. This was done by comparing the dates, positions by provinces and amounts of Agent Orange disbursed during herbicide missions in the Republic of South Vietnam with the known place and time of assignment of the "theater" women veterans.

Results and Discussion

A major finding of the analysis is that the greatest number of significant differences was found when comparing the Agent Orange -exposed and unexposed veterans. The majority of illnesses or injuries reported by "theater" veterans were reported by women in the exposed group (64%). These categories included disabilities that prevented work as well as the total number of health problems.

Women veterans in the exposed group were significantly more likely to report a cancer diagnosis than unexposed women in for both the crude (OR 4.73; $p=.056$) and adjusted comparisons (OR 3.25; $p=.02$). There was also suggestive evidence that exposed women were more at risk for developing soft tissue sarcoma, Hodgkin's disease, non-Hodgkin's lymphoma, respiratory cancers and multiple myeloma than unexposed women (OR 5.75; $p=.06$).

Women in the exposed group reported more negative reproductive outcomes than unexposed women. These outcomes included miscarriages, tubal pregnancies, stillborns and children who died before their first birthday. This difference was significant for the crude and adjusted comparisons ($p=.04$).

The data of NVVRS was the first opportunity to compare women "theater" veterans with comparable cohorts of "era" veterans and civilians. This study design provided a strong platform for contrasting and quantifying the health problems of these women. The strength of the Agent Orange comparisons in this analysis comes from the fact that none of the women were actually asked if they had been exposed to the herbicide. Exposure was established by an objective process matching available information on the locations and dates of Ranch Hand Spray Missions and ground applications of Agent Orange with the duty assignments of each "theater" woman.

Prior to this analysis, estimates of women veterans' health were based on projections and anecdotal information. Until now, these women who had served their country in war, have been left to speculate and ruminate about the meaning of their health problems and adverse reproductive outcomes because their only frame of reference was studies conducted on men. The findings reported here provide persuasive evidence that these women veterans have health problems - Multiple Sclerosis, Anemia and Cancers - that differ from what we know about the men who served in Vietnam.

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