

The health status of working women in Hawaii

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The effect of work on women's health was examined in this study by comparing selected health indicators and specific chronic conditions among employed men, employed women and housewives. The study analyzed data from the Hawaii Health Surveillance Program. The study group was comprised of 56,203 subjects and represented a randomly stratified sample of the population interviewed during the period 1981-1986. Housewives as a group were older, less educated and reported the lowest family income compared to employed men or employed women. The prevalence of several specific chronic conditions were higher among housewives than in employed men and employed women. Multiple regression analysis tested the difference in several health indicators (chronic conditions, hospital episodes and restricted activity days) between employed men, employed women and housewives, controlled for sociodemographic variables. The health status of housewives was clearly worse than that of employed men and employed women by all health indicators; employed women had more hospital episodes than employed men. The results suggest that mostly healthy women are selected for the labor force. Among employed women, those in poor health and needing hospital services more frequently, are probably at high risk of dropping out of work. Our study projects the importance of promoting occupational good health for employed women during their working life.

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Introduction

During the last 5 decades, Hawaii has gone from a largely agricultural to a more diversified economy. The number of workers employed in agriculture has steadily declined while workers in manufacturing, trade, finance, business, professional services, etc. have increased¹. In Hawaii, as elsewhere, the growing need for workers in less physical but more skilled jobs was followed by an increase in participation by women in the labor force.

The impact of employment on their health is not clear. Some earlier studies indicate a greater risk for coronary heart disease among women employed in clerical jobs², but other studies show no difference in the risk for coronary heart disease related to employment status³. It also has been stated there is both a delay in diagnosis and under-reporting of occupational disease in women⁴.

In Hawaii, there is little information on the health status of employed women. Previous reports indicate the number of injuries and diseases in the State's working population but not separately for women⁵. The purpose of the present study was to separately examine selected health status indicators and the prevalence of specific chronic conditions among employed men, employed women and housewives.

Methods

Data in the present study was collected during the period 1981-86 as part of the Hawaii Health Surveillance Program (HSP), an on-going, statewide health survey originally conceived in 1970.

A description of the survey method was published in 1986⁶. In brief, the survey sample represented the non-institutionalized resident population of the State of Hawaii. The sample was based on households excluding the areas of Kalawao County (Molokai Island) and Niihau Island. The HSP annually used a stratified systematic sample. Stratification during sampling was by geographical area. Sampling was systematic in that within each stratum a unique sampling interval was used. The sampling interval was selected according to the number of households in a given geographical area, in an attempt to equalize sampling errors and confidence levels among geographic strata. As a result, a higher percentage of subjects were interviewed in less populous areas in a given year than in more densely populated areas.

The HSP was modeled after the Health Interview Survey (HIS) of the National Center for Health Statistics. Many of the

concepts, definitions, questionnaire questions and procedures of the HSP were similar to those used by the HIS. The basic questionnaire had been in use since 1970. After several changes in occupational and industry classifications, the current version of the questionnaire has been in use since 1981.

Our study survey was conducted by personal interviews in the participants' homes. The interviewers were assigned, as much as possible, to study areas close to their own residences, mainly for economic reasons. In an attempt to minimize variations between interviews in the collection of data, the HSP staff monitored the interviewers' "no response" cases and reassigned eligible non-interviewed households to other staff people. The HSP staff also periodically conducted training programs for interviewers in an attempt to standardize their interviewing techniques. In order to avoid any seasonal variations, the interviews were equally divided into four seasonal periods, and in each season, by months. The overall response rate during the present 6-year study was 80%.

The employment status of the subjects in the current study was based on their responses to questions about their current activity. Those who responded that they were students, retired, disabled, or not employed were excluded from the present analysis. The housewives category was based solely on the respondent's declaration; it included both married and unmarried women. Occupation and industry were listed for both employed women and men according to the 1980 U.S. Bureau of Census "Classified Index of Occupation and Industries". These were regrouped into 16 occupation and 16 industry categories by the HSP for the purposes of analysis.

Sociodemographic variables.

There were 3 groups, classified by age: 29 years or less, 30-50 years and 51 years or more. This was done in order to compare specific chronic conditions in different age strata in the employed men, employed women and housewives.

Racial grouping had been done on the basis of the mother's race as reported by the participants, and classified into 9 groups: Caucasian, Japanese, Filipino, Hawaiian, Chinese, Black, Puerto Rican, Korean and Samoan⁸. However, for the purposes of our analysis, the last 3 groups were combined into "other minorities" because of the small number of participants. Marital status, education level and annual family income were recorded based on information provided by the participants during the interviews.

Indicators of health

The selected health indicators used in the analysis were defined as follows: "chronic conditions" included the number of reported chronic health conditions; "hospital episodes/year" was the second indicator and "restricted activity days/month" included the number of days/month a person had to cut down on his/her usual activities for the whole of that day because of illness or injury.

Specific chronic conditions were reported by the participants and classified into six major groups: diabetes, heart disease, hypertension, cerebrovascular disease, malignant neoplasm and (bronchial) asthma.

The analysis of the data consisted of (a) descriptive statistics of the socio-demographic variables and health indicators

separately for employed men, employed women and housewives and (b) multiple regression analysis (MRA). Because of the potential for a confounding effect of sociodemographic and occupational variables on the association between health indicators and the 3 groups, (1) employed men vs. employed women, (2) employed women vs. housewives and (3) employed men vs. housewives, stepwise MRA was used for each indicator and each of the 3 groups separately. In each MRA, the group variable was introduced last in the order of independent variables, age, marital status, mother's race, educational level, family income and occupation, in an attempt to measure the net effect of the group variable. The F-test was computed as:

$$F = \frac{e_i^2 - 6 - e_i^2 - 5}{Rm_i^2 - 6}$$

$e_i^2 - 6$ = Sum of squares of all independent variables.

$e_i^2 - 5$ = Sum of squares of 5 independent variables (without the group variable).

$Rm_i^2 - 6$ = Residual mean square.

In an attempt to estimate the size of the differences between the 3 groups, the percent difference was calculated for each health indicator and for each group separately as:

% Difference = B / Mean,
where,

B = Partial regression coefficient of the group variable in the MRA.

Mean = Unadjusted mean of health indicator for men (in the case of the group employed women vs. housewives, the mean for employed women).

A percentage greater than 15% was taken as having practical significance.

Results

The study group included 56,203 subjects, of which 29,632 (52.7%) were women and of them 20,296 (68.5%) were employed women; the rest were housewives. The proportion of employed women in the total labor force was 43.3%.

Sociodemographic characteristics

The mean age for employed men was 38.6 (SD, 13.4), for employed women, 38.2 (SD, 12.9) and for housewives, 45.5 (17.9) years. Figure 1 shows the similarity in the age distribution pattern of employed men and women, except in the older age group (95th percentile) where employed women relatively younger than employed men. Housewives were much older than employed men and employed women.

Table 1 shows a similar ethnic distribution among employed men and employed women. The major ethnic groups in the study were Caucasian and Japanese. Japanese

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Table 1				
Percent Distribution of Selected Sociodemographic Characteristics Among Employed Men, Employed Women, and Housewives.				
	Total (n=56,203)	Employed Men (n=26,571)	Employed Women (n=20,296)	House- wives (n= 9,336)
MOTHER'S RACE				
Caucasian	33.5	33.0	29.1	34.0
Japanese	25.2	26.2	30.6	21.5
Filipino	14.5	14.3	15.3	13.4
Hawaiian	13.2	13.1	12.2	15.3
Chinese	4.8	4.7	5.1	4.7
Black	1.4	1.9	0.9	1.6
Other minorities	7.3	6.9	6.8	9.5
Total	100.0	100.0	100.0	100.0
MARITAL STATUS (*)				
Married	67.6	66.2	63.9	79.7
Widowed	3.5	1.0	3.8	10.1
Not Married	29.0	32.8	32.3	10.1
Total	100.0	100.0	100.0	100.0
EDUCATION (**)				
Low	15.4	12.9	11.6	30.8
Middle	76.7	77.8	78.7	67.1
High	7.9	9.3	8.7	2.1
Total	100.0	100.0	100.0	100.0
FAMILY INCOME (***)				
Low	8.4	6.3	7.3	16.8
Middle	57.6	58.1	55.6	55.4
High	20.3	21.7	22.3	11.6
Unknown	13.7	13.9	14.8	16.2
Total	100.0	100.0	100.0	100.0
* Not married includes divorced/separated, single (never married and common law marriages). ** Low education = 0-11 grades; middle education = high school, college and business/trade school; high education = graduate school. *** Low income = < \$10,000/year; middle income = \$10,000 - \$39,999/year; high income = > \$40,000/year.				

women made up the highest percentage (30.8%) of employed women, while Caucasians comprised the highest percentage (34%) of housewives. The housewives group included the highest percentage of married and widowed persons. Housewives also reported the lowest annual family incomes and had the lowest education levels.

Table 2 shows the prevalence of specific chronic conditions among the employed men, women and the housewives. The prevalence rate of the chronic conditions increased with increasing age in all groups (except for bronchial asthma). The prevalence of diabetes, heart disease, hypertension and bronchial asthma was higher in housewives than in employed men and women in all age groups. Employed women have a higher prevalence of bronchial asthma and malignant neoplasm than the men, whereas the men have a higher prevalence of hypertension than employed women. In the employed

Table 2			
Prevalence of Specific Chronic Conditions Among Hawaii's Working Population by Age and Gender (Rates 1:1000)			
	29 or less	30-50 years	51 or more
DIABETES			
Employed Men	0.32	15.00	56.14
Employed Women	0.40	18.60	50.18
Housewives	0.44	25.07	97.13
$\chi^2 (2)$	1.73	12.36 ***	84.08 ***
HEART DISEASE			
Employed Men	3.80	10.42	50.53
Employed Women	5.34	10.29	31.89
Housewives	7.04	14.55	80.94
$\chi^2 (2)$	4.38	6.04 *	44.46 ***
HYPERTENSION			
Employed Men	13.56	71.73	238.25
Employed Women	7.85	68.76	201.58
Housewives	17.18	74.28	311.84
$\chi^2 (2)$	15.55 ***	5.08	115.06 ***
CEREBROVASCULAR DISEASE			
Employed Men	0.13	0.85	6.67
Employed Women	0.33	0.89	1.48
Housewives	0	1.85	10.08
$\chi^2 (2)$	1.28	2.78	24.52 ***
MALIGNANT NEOPLASM			
Employed Men	0.51	3.80	13.18
Employed Women	1.33	6.83	14.09
Housewives	2.20	4.02	24.42
$\chi^2 (2)$	5.54	11.65 *	19.33 ***
BRONCHIAL ASTHMA			
Employed Men	30.42	22.86	20.70
Employed Women	45.41	35.32	27.69
Housewives	49.34	43.33	32.11
$\chi^2 (2)$	28.73 ***	50.58 ***	12.34 **
* P < 0.05 ** P < 0.01 *** P < 0.001			

population, the prevalence of diabetes and cerebrovascular disease was higher among women younger than the 30-50 year age group, but higher in the men in the older age group. Except in the younger age group, the prevalence of heart disease was higher among the men than in the employed women.

Table 3

Comparison of Chronic Conditions, Hospital Episodes/Year and Restricted Activity Days/Months in Employed Men, Employed Women and Housewives.

	CHRONIC CONDITIONS	HOSPITAL EPISODES/YEAR	RESTRICTED ACTIVITY DAYS/MONTH
	Mean (S.E.)	Mean (S.E.)	Mean (S.E.)
(a) Employed Men	0.74 (0.007)	0.04 (0.002)	0.95 (0.024)
(b) Employed Women	0.79 (0.009)	0.09 (0.002)	1.00 (0.028)
(c) Housewives	1.11 (0.017)	0.17 (0.005)	1.42 (0.051)
t-test			
(a)-(b)	- 3.77 ***	- 13.10 ***	- 1.19
(b)-(c)	- 15.53 ***	- 14.31 ***	- 6.62 ***
(a)-(c)	- 18.53 ***	- 23.31 ***	- 7.56 ***
Multiple Regression Analysis			
F-test			
(a)vs(b)	6.02 *	66.54 ***	2.03
(b)vs(c)	53.56 ***	79.80 ***	20.09 ***
(a)vs(c)	32.42 ***	185.63 ***	9.60 ***
% Difference			
(a)-(b)	4	85	6
(b)-(c)	18	76	26
(a)-(c)	14	300	19

* P < 0.05
** P < 0.01
*** P < 0.001

Among the younger age group (29 years or less), the differences in the prevalence of chronic conditions between the men, the employed women and the housewives were statistically significant only with respect to hypertension and bronchial asthma. In the 30-50 year age group, the differences were even more statistically significant; in the older age group (51 or over), all of the differences were statistically significant.

Table 3 provides a comparison of selected health indicators between employed men, employed women and housewives. The unadjusted data for chronic conditions, hospital episodes/year and restricted activity days/month showed that compared to the men, employed women have a higher mean incidence in all 3 health indicators. Housewives had even higher levels, indicating that they had the worst health status. The differences between the 3 groups were statistically significant, except for the difference in restricted activity days/month between the men and the employed women.

The results of the multiple regression analyses showed that, after controlling for sociodemographic variables, the significant differences in health indicators remained. When expressed as percent differences, the difference in chronic conditions between employed women and housewives was significant (18%), but that between the men and the employed

women was not (4%). Striking differences were found in the use of hospital services, ie, the number of hospital episodes/year. There was a 76% difference between employed women and housewives and a 300% difference between employed men and housewives. There was also a large difference (85%) between the men and employed women in the number of hospital episodes/year. The percent differences in restricted activity days/month were small (6%) between employed men and women, but higher (26%) between employed women and housewives.

Discussion

The present study detailed some important differences between employed women and housewives. Compared to the former, housewives were older, less educated, more married, more widowed and had lower family incomes. The number of women in Hawaii who are employed was similar to the proportion reported for the United States as a whole³. However, the women in the State who sought employment still tended to gravitate to the traditional "female" occupations. Nevertheless, there has been a trend toward getting into the professional fields, as in the case in most societies that have technologically advanced industries⁹. The overall growing number of women in the labor force is resulting in the need for more attention to the health status of women at work¹⁰. Ours is the first study in Hawaii comparing the health status of employed men, employed women and housewives.

The main finding of the study was that the employed women in Hawaii have better health status than housewives. The high prevalence of chronic health conditions found among housewives supported previous studies suggesting that healthy women tended to be in the labor force, while women in poor health remained at home as housewives^{10,11}. The self-selection by healthy women plays an important role in the participation of women in the labor force¹². In most of the specific chronic conditions considered in the present study, the prevalence rate was higher in housewives than among employed women or employed men. The health status indicators showed that employed women have fewer chronic conditions, hospital episodes/year and restricted activity days/month than housewives; this was similar to the results of other studies³.

It is important to clarify the reasons for the apparent difference in health status between employed women and housewives. An earlier study suggested that the difference in health status may simply reflect a reporting problem. It has been suggested that the employed women, under-reported health problems so as not to jeopardize their jobs, whereas housewives over-reported their afflictions as justification for not having jobs. That same study, however, reported a positive correlation between reported health problems and deaths¹³.

In the present study, the morbidity data on specific chronic conditions were consistent with selected health indicators, showing clearly that housewives have both higher chronic morbidity and worse health indicators than employed women. Of particular note is the higher utilization of hospital services by housewives than by female employees, which confirms the results of another study which indicated less use of physicians and hospital care by employed women as compared to housewives^{3,12}.

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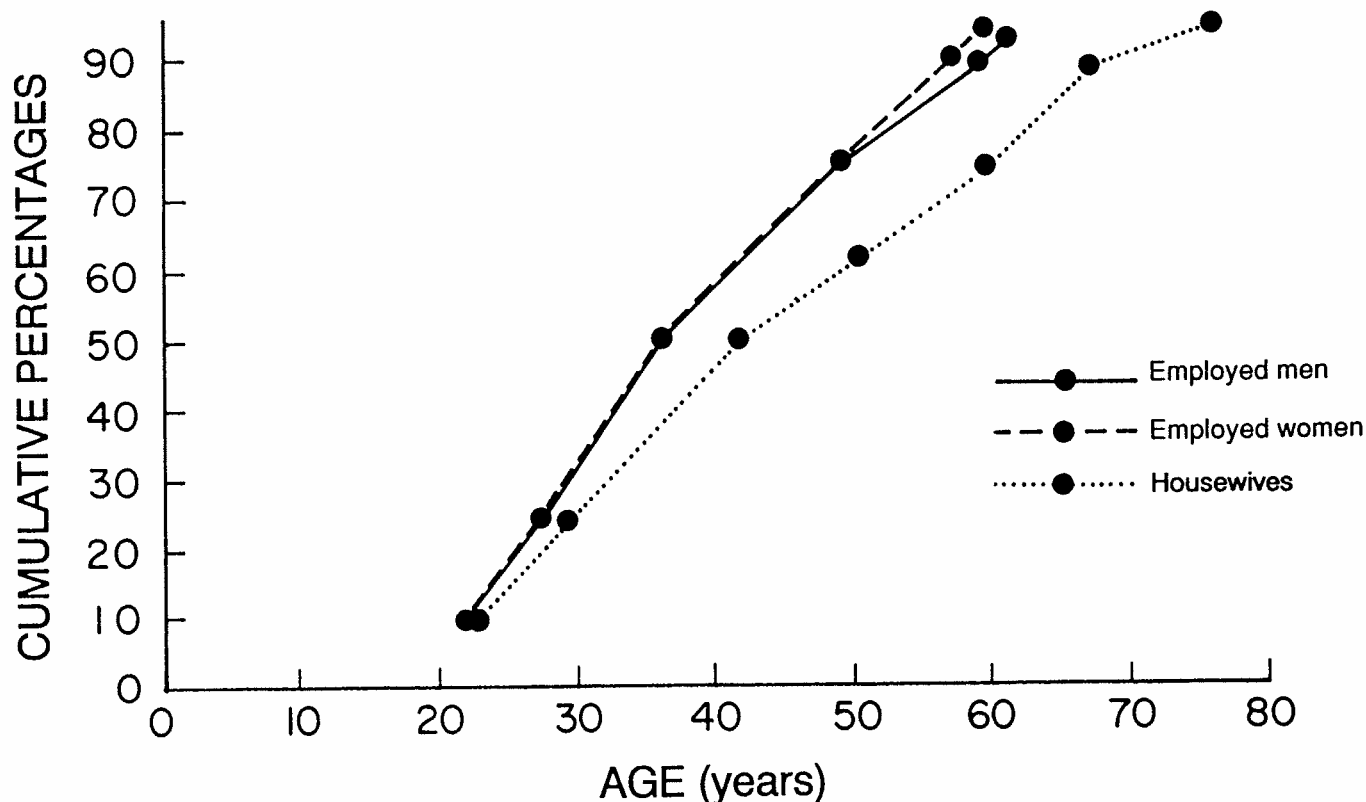
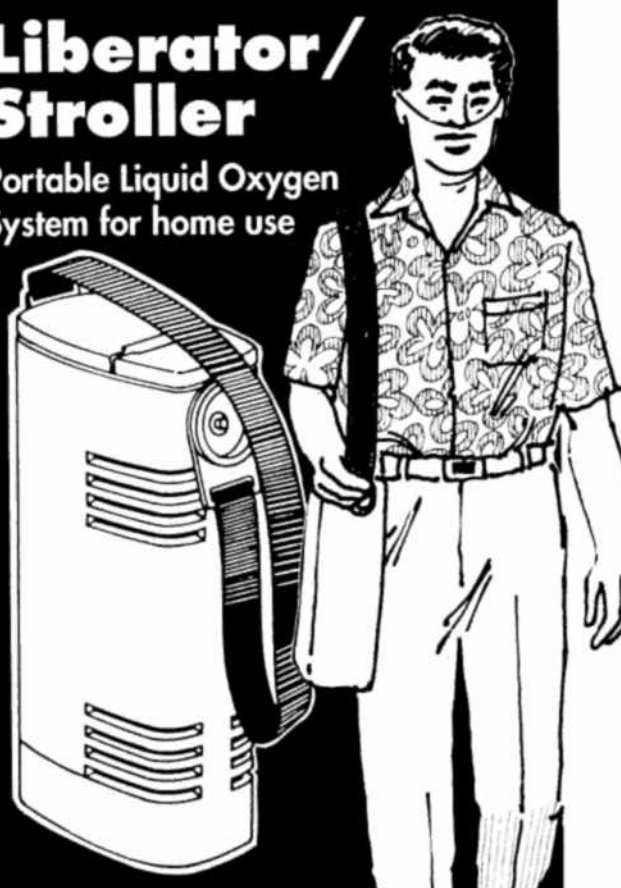


Figure 1: Age distribution of employed men, employed women and housewives.

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The possibility of a genetic or physiological predisposition for a more active lifestyle among women employees has been discussed in the past. It has been suggested that a measure of this more active profile may be found in the higher serum level of high density lipoprotein (HDL) cholesterol; this has been reported as lowering the risk of coronary heart disease¹⁴. However, the results of the present study demonstrated that, in addition to the lower prevalence of coronary heart disease in employed women as compared to housewives, other chronic conditions not related to HDL-cholesterol were also less frequent, thus suggesting that other factors are involved.

The age distribution (Figure 1) showed an increased drop-out rate of employed women after the age of 50 years, which correlates with an increase in the percentage of housewives.

An important question to be addressed in future occupational health research is whether housewives are a select group because of family, social and physiological considerations or whether women also choose to be not employed because of the inappropriate working conditions and lack of adequate controls on exposure to hazardous materials at the job site. Maybe this leads to early retirement from work. One indication of the later in our study was the higher hospitalization-utilization by employed women as compared to employed men.

The challenge for providers of occupational health services will be to identify women who are employed, to be at higher risk for occupational morbidity, and to introduce primary and secondary intervention programs aimed at preventing early disemployment from the work force.

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