

# Occupational exposure to home risk factors: analysis of physical and mental health condition of a group of Sicilian housewives

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## Abstract

**Introduction:** the work of housewives, in many ways, still lacks professional respect; particularly with respect to the neglect of exposure to risk factors such as: chemical, physical, biological, psychological and accidents. The purpose of this study is to analyze the possible impact of environmental risk factors on the physical and mental health of a group of Sicilian housewives.

**Methods:** we enrolled housewives living in Palermo and Catania and administered an anonymous questionnaire to obtain knowledge of three factors: (1) the habits of the respondents, (2) the type of house in which they lived and worked, (3) the diseases they suffered. We also administered them a hospital anxiety and depression scale questionnaire. A statistical analysis was performed calculating the p value and a Yates chi square test to compare the percentages of diseases that emerged in three different groups: (1) the sample, (2) an ISTAT report on women of the same average age performing various work tasks 'other than housework' and (3) an ISTAT nationwide report on the housewives of the same average age. Finally, we evaluated the average questionnaire scores measuring anxiety and depression, and correlated those scores with age.

**Results:** the sample group consisting of 468 housewives showed high percentage of allergic disorders (35.6%), which is statistically significant when compared to the ISTAT national data on women generally and housewives particularly of the same average age. The evaluation of data on anxiety and depression showed an average score indicating borderline

pathology for both (anxiety and depression) and increasing proportionally with increasing age.

**Discussion:** it is considered appropriate to inform society and the scientific community about the issues concerning these housewife workers, who must be regarded as and recognized as workers.

**KEY WORDS:** housewives, home risk exposure, diseases, accidents.

## Introduction

The deep and rapid economic and social changes that occurred over the last 60 years in Western Society have also changed the characteristics of our Country. Up to the beginning of the twentieth century, our economy was based on agricultural. Subsequently, with the industrial transformation of the economy especially after World War II, there was a progressive development of the tertiary services. In 2001 in Italy 5.2% of workers were employed in agriculture, 31.7% in industry and 63.1% in the services sector. In the third quarter of 2015, there were 815,000 people employed in agriculture (3.6%), in industry 6,034,000 (26.9%) and in the services sector 15,648,000 (69.5%) (1, 2).

Therefore, the indoor work (e.g. service) is prevalent today, but much neglected until the mid-70s and considered no more dangerous to workers' health than other sectors, has increasingly become the subject of scientific interest.

The number employed in the services sector would be even greater if it included all those who carry out work activities related to the care of their homes. This population has never been considered productive, in as much as such activities are carried out free of charge (i.e. not compensated with payroll wages) (3). At the beginning of the '90s, the number of housewives in Italy was estimated at 9.805 million, while in 2013 there were 7.562 million with a decrease of 22.8% in recent years (4, 5).

The analysis of injury and risk factors related to this sector shows that employee exposure to pathogenic *noxae* of various kinds is even higher than that of other traditional indoor working environments such as offices. Just consider for example detergents products used in washing, cleaning, and the maintenance of the house; disinfectants and pesticides; or various combustible products which are formed during the preparation of meals. See Table 1 for a list of some such pathogenic products found in the home (6).

Besides the risk of pollutants in the home there are also conditions for injury, which statistics clearly show common. Based on approximate measures, it seems that in Italy, during the first half of the '90s, domestic accidents

**Table 1 - Main sources of pollutants at home.**

Source of pollution	Causative agents
Building materials	radon, asbestos, mineral fibers
Covering materials (carpets, tapestries)	volatile organic compounds, biological contaminants
Furniture	formaldehyde, volatile organic compounds
Wood paneling	pentachlorophenol, other pesticides, fungicides, solvents
Insulation materials	asbestos, mineral fibers, volatile organic compounds
Apparatus for combustion (gas stoves, heaters)	gas (NOx, SOx, CO, O3), polycyclic hydrocarbons
Cleaning products (spray)	volatile organic compounds, fluorocarbons, solvents
Conditioning systems	bacteria, fungi, viruses
People, pets, plants	bacteria, fungi, viruses, pollen, organic droppings, pesticides
Cigarette smoke	gas, polycyclic hydrocarbons, respirable particles, volatile organic compounds
Water (faucets, showers ...)	chlorine, radon, volatile organic compounds
Outdoor air	particles, gases, biological contaminants, pesticides

amounted to more than a million per year, of which between 4,500 and 6,500 were fatal (especially due to fire), i.e. three times the number of deaths from accidents in the workplace (7).

The ISTAT data in 1999 reported 3,000,000 domestic accidents in which women were the most affected: the ratio of women's injuries to men's was 3:1.

In 2006, ISTAT reported 3,200,000 domestic accidents (64% in women and 36% in men), highlighting serious and widespread phenomenon which still must be exactly interpreted, because not all occurred in housewives during their work, but in all the inhabitants of the house (8). In 1999 in Italy a law was approved making it compulsory to take out an insurance policy for all housewives between the ages of 18 and 65, including male subjects who perform domestic work in their own (9). Given the increased sensitivity to the problem of 'working-at-home', in recent years there has been a reduction of accidents in the home for housewives. The latest INAIL data on accidents reported in the 'working-at-home' occupational category, showed a downward trend with a reduction of 57.4% in the period 2010-2014 (10) (Tab. 2). We have no data on possible occupational diseases in this category, and there aren't sufficient studies around the world that will give us a rough estimate. Also, there is little information about problems associated with exposures to certain home risk factors.

The purpose of this study is to present an analysis of the possible environmental risk factors associated with physical and mental health in a sample group of Sicilian

housewives, noting the epidemiology of diseases linked to the performance of their work activities at home.

#### Materials and Methods

We enrolled housewives born and living in Palermo and Catania. The women were given an anonymous questionnaire seeking information about their habits and the type of house in which they operated, in order to estimate the prevalence of possible diseases correlated with exposure to risk factors present in the home. Questions were asked about: the length of employment, smoking habits, presence of domestic workers at home, the type of detergents used, working times (hours and days), accompaniment of children, social activities, presence of pets, use of pesticides for plants, use of computers and the ability to drive cars. We also investigated the conformity of electrical systems with European regulations EEC, the type of heating, the presence and approximate purchase date of some appliances, the number of rooms and windows in the house, and existence in the building of an elevator. We asked even what activities (for example cleaning floors or during the preparation of meals) were performed during occurred accidents (burns, fractures, explosions, fires) and if they was affected by major diseases, such as: hypertension, diabetes, cardiovascular diseases, allergopathies, arthrosis, slipped disc, respiratory diseases and so on, with particular emphasis on allergic diseases and spinal

**Table 2 - Trend of accidents reported by housewives in the period 2010-2014 (source INAIL).**

Year	2010	2011	2012	2013	2014
Number of injuries reported	1489	1166	1047	915	634
Percent reduction from the previous year		-21,7%	-10,3%	-12,6%	-30,7%

injuries associated with heavy lifting. The survey population was also administered a validated questionnaire: "Hospital anxiety and depression scale test", to estimate the presence of anxiety and/or depression. There were 14 questions, (7 anxiety measures and 7 depression) with a scores scale of 0 to 21 for each condition (anxiety and depression). Every question could obtain a score from 0 to 3. This scale is a measure of the severity of the anxiety and depression experienced by the respondent – see Figure 1 below (11, 12). A statistical analysis was performed to compare the percentages of physical diseases reported in the sample with those obtained by ISTAT on women of the same average age, performing various work tasks. The percentages of diseases reported by the survey sample were also compared with those of housewives of the same average age nationwide. We calculated in both cases the p value and the chi-square test according to Yates. We also examined the average level of anxiety and depression, on the basis of the findings of the questionnaire Hospital anxiety and depression scales.

**Results**

The sample consisted of 468 subjects, all female housewives with an age between 19 and 86 years; the aver-

age number of children for each women was 2.4. The general characteristics of the sample population are described in Table 3.

Among the women recruited for the study 112 (23.9%) worked previously in other activities: 55 were administrative employees (11.8%), 37 teachers (7.9%), 11 contractors (2.3%), traders 5 (1.1%), 4 dressmakers (0.9%). Table 4 summarizes the housewives' habits and type of work done in the home. In the total sample 111 were smokers (23.7%).

The physical and mechanical characteristics of homes are shown in Table 5.

One hundred and sixty four housewives in the group (35%) reported having suffered significant injuries in the home, but only 79 subjects (16.8%) were precise: 70 cases (14.9%) reported suffering fractures in upper and lower limbs and 9 head injuries (1,9%). Also, one housewife experienced an explosion. There were no noteworthy injuries from fires or electrocutions.

The main diseases reported in the sample are shown in Table 6, where they are compared with the ISTAT statistical data on 'All women in Italy' of the same average age and with women of the same average age performing the job of housewives.

Specifically, in the sample, allergopathies found in 167 cases (35.6%) are as follows: 69 cases of rhinitis (14.7% of the total of the sample), 39 of conjunctivitis

**Table 3 - Composition of the sample.**

Number of housewives in the sample	Age (mean ± DS)	Seniority in years (mean ± DS)	Hours of work in a day (mean ± DS)	Number of housewives with previous different work
468 (100%)	51 ± 13.7	24.1 ± 15.2	8.2 ± 2.5	112 (23.9%)

Name: \_\_\_\_\_ Date: \_\_\_\_\_

**Instructions:** Doctors are aware that emotions play an important part in most illnesses. If your doctor knows about these feelings he or she will be able to help you more. This questionnaire is designed to help your doctor know how you feel. Read each item and place a firm tick in the box opposite the reply which comes closest to how you have been feeling in the past week. Don't take too long over your replies: your immediate reaction to each item will probably be more accurate than a long thought out response.

1. I feel tense or 'wound up':	A	8. I feel as if I am slowed down:	D
Most of the time	3	Nearly all of the time	3
A lot of the time	2	Very often	2
Time to time, occasionally	1	Sometimes	1
Not at all	0	Not at all	0
2. I still enjoy the things I used to enjoy:	D	9. I get a sort of frightened feeling like 'butterflies in the stomach':	A
Definitely as much	0	Not at all	0
Not quite so much	1	Occasionally	1
Only a little	2	Quite often	2
Not at all	3	Very often	3
3. I get a sort of frightened feeling like something awful is about to happen:	A	10. I have lost interest in my appearance:	D
Very definitely and quite badly	3	Definitely	3
Yes, but not too badly	2	I don't take as much care as I should	2
A little, but it doesn't worry me	1	I may not take quite as much care	1
Not at all	0	I take just as much care as ever	0
4. I can laugh and see the funny side of things:	D	11. I feel restless as if I have to be on the move:	A
As much as I always could	0	Very much indeed	3
Not quite so much now	1	Quite a lot	2
Definitely not so much now	2	Not very much	1
Not at all	3	Not at all	0
5. Worrying thoughts go through my mind:	A	12. I look forward with enjoyment to things:	D
A great deal of the time	3	As much as I ever did	0
A lot of the time	2	Rather less than I used to	1
From time to time but not too often	1	Definitely less than I used to	3
Only occasionally	0	Hardly at all	2
6. I feel cheerful:	D	13. I get sudden feelings of panic:	A
Not at all	0	Very often indeed	3
Not often	1	Quite often	2
Sometimes	2	Not very often	1
Most of the time	3	Not at all	0
7. I can sit at ease and feel relaxed:	A	14. I can enjoy a good book or radio or TV programme:	D
Definitely	0	Often	0
Usually	1	Sometimes	1
Not often	2	Not often	2
Not at all	3	Very seldom	3

Scores of 0-7 in respective subscales are considered normal, with 8-10 borderline and 11 or over indicating clinical 'caseness'.

Source: <http://www.sadness101.com/HAD.html>

Figure 1- Hospital anxiety and depression scale test.

**Table 4 - Habits and occupational exposures in the home number and percentage of subjects.**

Investigated characteristic	Number of subjects and percentage
With domestic workers	120 (25.6%)
Pets at home	153 (32.6%)
Users of pesticides for plants	251 (53.6%)
Users of detergents (especially bleach and ammonia)	421 (89.9%)
Hand washing	436 (93.1%)
Cleaning the house and cook	449 (95.9%)
Owners of washing machine	468 (100%)
Owners of vacuum cleaners	419 (89.5%)
Owners of dishwashers	227 (48.5%)
Owners of microwave oven	208 (44.4%)

**Table 5 - Physical and mechanical characteristics of homes.**

Investigated house characteristics	Number of owners subjects and percentage
Electrical system according to law	392 (83.7%)
Average number of rooms	4.5
Average number of windows	6.5
Presence of elevator in the building	415 (88.7%)
Autonomous heating (radiators)	152 (32.4%)
Central heating	123 (26.2%)
Air conditioner to use to heat	71 (15.1%)
Fireplace	23 (4.9%)
No type of heating	99 (21.1%)

(8.3%), 20 of urticaria (4.2%), 17 of asthma (3.6%), and finally 22 of atopic dermatitis (4.7%), percentages with results comparable to other studies carried out in the past in dermatology (13).

In the group of sample housewives with osteoarthritis, 23 reported herniated discs (4.9% of the total sample) detected with CT and MRI, while the other 36 have reported arthrosis in multiple location (7.7%) uncomplicated by disk disease. Among the women with heart diseases, 11 reported a previous myocardial infarction (2.3% of the total sample), 2 had a Wolff-Parkinson-White syndrome (0.4%), 1 had a pacemaker (0.2%). Other diseases reported were found in very few cases and not representative, therefore not an object of interest.

Analyzing the results shown in Table 6, we can see that in our sample there is a statistically significant difference of number of allergies compared to the other groups, in the sense of a greater number of cases. Instead Sicilian housewives, regarding the prevalence of diseases such as diabetes, hypertension and osteoarthritis, show similar prevalences to Italian women of the same average age performing other jobs, and very different from those of the Italian housewives, which showed values much higher than the other two groups.

Survey questions were meant to generate psychological

profiles; assessing 'anxiety and depression', and 'behavioral habits'. Table 7 summarizes the behavioral habits.

As noted above, survey questions pertaining to psychological profiles used a numerical scaling method for measuring the degree of anxiety and depression suffered by the women. The scoring range from 0 to 21 is directly proportional to the severity of the condition: 0-7 is considered normal, 8-10 borderline and 11-21 pathological.

The analysis of the data found a total average value of 10.11 (DS 4.16) for anxiety and 7.35 (SD 4.24) for depression. Further, dividing the test subjects by age shows that there are slightly lower values in younger women, under the age of 50. Their average anxiety score was 9.71 (DS 4.14), and 6.38 for depression (SD 4.27). For the women over fifty: an average anxiety score of 10.4 (SD 4.18) and average depression score 8.05 (SD 4.11) (see Figure 2).

In only a few cases there was a prevalence of depression. For example, a fairly unique case of a twenty-five year old woman who had a very high level of anxiety and depression with respective scores of 18 and 16. Other studies conducted in other countries confirm the results we have obtained (14, 15).

**Table 6 - Percentage of diseases found in the sample in comparison with national data on women in general (age 45-54 years) and with national data on housewives (age 45-54 years). The statistically significant differences are highlighted in bold. Source: ISTAT.**

		Hypertension	Diabetes	Cardiovascular diseases	Allergic diseases	Arthrosis
Sample in exam		n. 25 (5.3%)	n. 12 (2.5%)	n. 14 (3%)	n. 167 (35,7%)	n. 59 (12,6%)
All women in Italy (45-54 years)		11.6%	2.2%	1.3%	13.3%	15.8%
Housewives in Italy (45-54 years)		30%	10.5%	5.6%	9.9%	34.2%
Sample in exam versus all women in Italy (45-54 years)	p value	0.17	0.74	0.73	<b>0.0004</b>	0.65
	OR	0.43	1.4	2.35	<b>3.62</b>	0.77
Sample in exam versus housewives in Italy (45-54 years)	p value	<b>0</b>	<b>0.04</b>	0,57	<b>0</b>	<b>0.0006</b>
	OR	<b>0.13</b>	<b>0.22</b>	0.52	<b>5.05</b>	<b>0.28</b>
Housewives in Italy (45-54 years) versus all women in Italy (45-54 years)	p value	<b>0.0024</b>	<b>0.0343</b>	0.2011	0.5961	<b>0.0045</b>
	OR	<b>3.27</b>	<b>5.22</b>	4.5	0.72	<b>2.77</b>

**Table 7 - Investigated habits to evaluate the psychological profiles.**

Investigated habit	Number of subjects and percentage
With driving license	340 (72.6%)
Using computer	91 (19.4%)
Practitioners hobby	161 (34.4%)
Associating with old friendships (started before the wedding)	187 (39.9%)
Associating new friends (started after marriage)	291 (62.1%)
Makes coffee just for herself	143 (30.5%)
Alcohol consumption between meals	72 (15.4%)

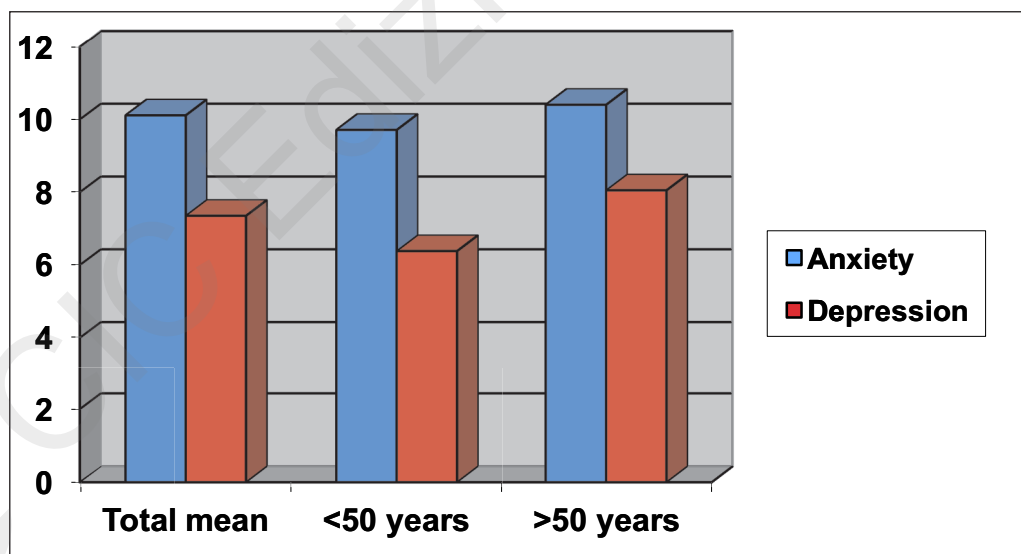


Figure 2 - Average values of score found in the evaluation of test anxiety and depression.

**Discussion**

Given the small size of the survey sample, no generalizations about the housewife population may be logical-

ly inferred. However, what can be said is that the worker category of 'housewives' was and still is in many ways neglected and denied professional dignity. Also importantly, there is a significant disregard to home 'work-

place' exposure to risks of various kinds: chemical, physical, biological, psychological and especially accident. The international scientific communities lack of interest in housewife habits and epidemiology is demonstrated by the paucity of professional literature on the subjects. This lack of interest is a result of the tendency to consider work done at home as 'non-work' because it is not compensated by payroll wages.

Further, given the observed epidemiology of the survey sample, it seems appropriate to differentiate the diseases not attributable to the *work* duties performed and those diseases that can sometimes have negative effects on the lives and the work of housewives. The finding of allergopathies in over 35% of the subjects evaluated and 35% accidents is indicative of the health significance of working in the home environment. Although, as noted, the small number of test subjects can not serve as a basis to infer definitive conclusions.

Another important point to emphasize is the pathology of the psychic sphere: the measurement of anxiety and depression increased with age, and the importance of 15% of housewives dedicated to alcohol consumption between meals, should lead us to consider the condition of these people who, for the lack of job satisfaction, for the lack of recognition of the work done and at the same time for daily tasks and responsibilities towards the family, more than others may experience symptomatic expressions of depression and/or anxiety.

Comparing national data of housewives with average age of those in our sample (45-54 years) with those of women of the same age in Italy, the numbers indicate that housewives in Italy are more at risk of high blood pressure, diabetes mellitus and osteoarthritis than women performing others works. Data that does not however apply for housewives Sicilian, perhaps for the adoption of appropriate lifestyles, such as perhaps, the Mediterranean diet.

In sum: the variety of risk factors and diseases caused by exposure to pollutants is considered appropriate research in the various branches of medicine and in particular the Occupational Medicine, where such research is considered of the highest importance. Research into the occupational hazards of working-at-home seeks knowledge of epidemiology, and proposing remedies and precautions in order to prevent physical and mental illnesses and injuries, just as it does for all other categories of workers.

All this should be part of a program of training of and providing information to housewives about work-at-home risks and also involving INAIL on topics other than work-related injuries, as already happens in the busi-

ness world. More sensitivity about these are needed, especially now that women/housewives are more emancipated and educated on average than in the past, and consider themselves workers who want to be recognized as workers.

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