The prevalence of musculoskeletal disorders and its predictors among Iranians' Housewives

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ABSTRACT

Background and aims: Musculoskeletal disorders (MSDs) are common among housewives. Therefore, this study aimed to estimate the prevalence of MSDs and its predictors among a group of Iranian housewives.
Methods: This cross-sectional study carried out on 600 Iranian housewives in 2014 that were selected using multistage random sampling from three cities including Karaj, Kashan and Yazd. The data were collected using Nordic questionnaire and were analyzed in SPSS software using chi-square and multiple linear regressions with Hosmer-Lemshow method.
Results: The total prevalence of MSDs was 53% and was not different in three cities (P>0.05). The highest prevalence of pain was found to be in the back region (51.33%), followed by neck (51%) and shoulder (41.5%) and least at wrist (40.5%). The possibility of pain in neck was related to husband's job (governmental compared to self-employed OR=1.6, CI 95%:1.09-2.63), older age (OR=1.06, CI 95%:1.01-1.11), higher height (OR=1.09, CI 95%:1.03-2.09), and more marriage duration (OR=1.08, CI 95%:1.01-2.05). The possibility of pain in back was related to educational level [guidance (OR=0.38, CI 95%:0.15-0.95) and high school (OR=0.31, CI 95%:0.13-0.94) compared to primary school] and heavier weight (OR=1.07, CI 95%:1.04-2.19), and finally the possibility of pain in shoulder was related to dominant hand [right hand compared to both hand (OR=4.6, CI 95%:1.2-17.8)].
Conclusion: Present study showed that the prevalence of MSDs in Iranian housewives is high and the educational level, height, weight and having husband with governmental job are as important predictors of MSDs among housewives. However, ergonomic training and informing the housewives about the risk factors of MSDs could prevent and postponed the occurrence of these disorders.

Keywords: Musculoskeletal disorders, Housewives, Iranian women.

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INTRODUCTION

Musculoskeletal disorders (MSDs) are defined as injuries and disorders in different parts of the body including muscles, nerves, tendons, ligaments, joints, cartilage and spinal.[1,2] These disorders are the main reasons for disability and low quality of life. On the other hand, the MSDs are as major public health problem that impose direct and indirect costs to the health care system.[2-4]

Today, the MSDs are the most important occupational health issues around the world and are prevalent among almost all the occupations, so that, most people experience musculoskeletal pain during their life.[5] MSDs are multifactorial phenomenon including genetic, anatomical, psychosocial and biomechanical factors. Genetic, anatomical, psychosocial and biomechanical factors may prevent the occurrence of injury and MSDs.[6]

Mismatch between the human capacity and physical requirements of the job, can lead to MSDs in different job groups such as housewifery. In addition, some studies have shown that the prevalence of pain, location of pain and other symptoms may be affected by posture and work habits and other demographic factors.[6-9] The previous studies suggest that the prevalence of musculoskeletal pain among women are more common than men and also the older women suffer from musculoskeletal pain more than the older men.[10-12] The prevalence of injuries among women in the United States, Ontario and Quebec in Canada were reported as 79%, 65% and 50%, respectively.[13]

Some occupations that require lifting and bending posture can lead to carpal tunnel syndrome and this disorder is more common in women than men.[11,12,14] Also, studies have shown that when women have exposure to repetitive jobs and carry work by awkward posture have complain of neck and shoulder pain more than men.[14,15] Different anthropometric characteristics between men and women are another factor that can lead to differences in prevalence and incidence of MSDs between two genders.[12,14] Otherwise, the threshold of pain among women is lower than men.[13,16] These condition can cause women to get MSDs more than men.

About half of the population in Iran are women. Housewives are a large population in Iranian societies and housewifery is known as an occupation in the country. There are abundant and diverse work stations in house for women in Iran. In addition, Iranian women are often responsible for tasks such as dusting, washing bathrooms and toilets, cleaning windows and mirrors and beds that can lead to contact with a variety of physical contact stress and consequently MSDs.

As we know there is limited information about housewife work condition in Iran. On the other hand, the women have traditionally played a key role in the health of their families in Iran. Therefore, study about the MSDs and detecting its predictors in this group is more important. This study was performed to determine the predictors and compare the prevalence and predictors of MSDs in housewives in three cities in Iran including Karaj (northern Iran), Kashan and Yazd (central cities in Iran). The results of this study can be used as a database in this field and could help for better planning regarding prevention of MSDs among women especially housewives.

METHODS

This cross-sectional study was carried out in 2014 to determine the prevalence of MSDs among a group of Iranian housewives age ranging from 20 to 65 years old. All subjects were married and had at least one year of marriage and lived in the Yazd, Kashan or Karaj cities in north and center of

Iran. All subjects were housewives who did not have any other occupation except housewifery.

According to previous studies in Iran, the prevalence of MSDs is more than 50%. However, regarding P=0.5, d=0.04 and α=0.05, the sample size is provided about 600 persons. The sample size included 200 persons from Karaj (northern Iran), 200 from Yazd and 200 from Kashan (center of Iran), they were selected using multistage random sampling. Firstly, according to the map, each city divided in to 5 regions included North, South, East, West and Central. Then the location of sampling starting point selected on the map of each region randomly. In the starting point for sampling, the first street on the left was selected as the location for sampling. In general, one street was selected from every third street and totally 5 streets were selected from each region and 4 alleys in every street was selected randomly. Finally two samples were selected from each alley. Sampling point in each alley was the first house on the right. In case of non-cooperation of one house the neighborhood was replaced.

To determine the prevalence of musculoskeletal disorders in different areas of the body, the Nordic questionnaire was prepared with little changes. Modified Nordic Musculoskeletal Questionnaire was applied to collect the data from each housewife. The questionnaire consisted of two parts including (a) socio-demographic characteristics, lifestyle and indicators assessing housework experiences. (b) The questions about musculoskeletal symptoms and question about presence of any existing or acquired trouble (aches, pains, discomfort and numbness) in different parts of the body. The validity of questionnaire was approved with at least 0.83 Content Validity Index (CVI) for every question and Cronbach's Alpha equal to 0.76. The measured variables were as follow: level of education, number of children, having another job beside housewifery? Type of husband's job, hand side, weight, height, Body Mass Index (BMI) and marriage duration. The main dependent variable under the study was self-reported musculoskeletal pain as follow: 'have you ever felt musculoskeletal pain in the last 12 months?' (Yes or No). Respondents were also asked to report on specific pain sites in the previous year by using a body diagram and sites were grouped into upper extremities, lower extremities and back pain. The informed consent was taken from all subjects before collecting the data. As stated earlier, if a woman refused, she was replaced with another one in neighborhood.

The data were analyzed in SPSS (Chicago, SPSS Inc). In bivariate analysis the chi-square test, independent t-test and unadjusted prevalence odds ratios were used to evaluate the association between MSDs and the independent variables of housework, as well as various potential covariates including age, weight, height, BMI, number children, having a job outside home, type of husband's job, educational level and dominant hand. To control the confounders and multivariate analysis, we used multiple logistic regressions with hosmer-lemeshow method. The statistically significant level was set at α=0.05.

RESULTS

The mean age of the subjects was 40.1±12.5 years old (the mean age were 41.5±12.3, 38.9±12.9 and 39.8±12.2 years old in Yazd, Karaj: and Kashan, respectively). The subjects' age were ranging from 20 to 65 years old.

This study showed that only 19% of the women have university education. The frequency distribution of educational level was different in three cities (P=0.047). About 54.7% of the subjects had governmental job that were not different in mentioned cities

(P=0.088). The mean age, weight, height, BMI, marriage duration and number of children were not different in three cities (P>0.05). Table 1 summarizes the qualitative and quantitative characteristics of the Study population.

Table 1: Physical and demographic characteristics of the participants by region

Demographic Variables		Total N (%)	Karaj N (%)	Yazd N (%)	Kashan N (%)
Education	Primary	243(40.6)	109(54.8)	58(29.1)	76(37.8)
	Middle	76(12.7)	22(11.1)	29(14.6)	25(12.4)
	High school	166(27.7)	42(21.1)	60(30.2)	64(31.8)
	University	114(19.0)	26(13.1)	52(26.1)	36(17.9)
Husband job	Government	307(54.7)	93(49.2)	96(54.2)	118(60.5)
	Self employed	254(45.3)	96(50.8)	81(45.8)	77(39.5)
Dominant hand	Both	130(22.1)	4(2.0)	18(9.2)	5(2.5)
	Left hand	432(73.3)	100(50.5)	12(6.2)	18(9.2)
	Right hand	27(4.6)	94(47.5)	165(84.6)	173(88.3)
Age (Mean ± SD)		40.1±12.5	38.9±12.9	41.5±12.3	39.8±12.2
Weight (Mean ± SD)		70.2±12.3	70.9±13.6	70.6±12.7	69.2±10.3
Height (Mean ± SD)		160.7±12.6	160.3±16.5	160.9±10.5	161±7.45
BMI (Mean ± SD)		26.6±54.3	26.1±7.55	27.1±4.7	26.4±3.94
Marriage duration (Mean ± SD)		21.2±13.2	22.2±12.6	21.3±13.1	20.3±13.7
Number of children (Mean ± SD)		2.57±16	2.35±15.7	2.67±15.7	2.7±16.4

The total prevalence of MSDs was 53%. The highest prevalence of pain was found to be in the back region (51.33%), followed by neck (51%) and shoulder (41.5%) and least at wrist (40.5%). Table 2 shows the prevalence of musculoskeletal symptoms and pain in different regions based on educational level, husband job and dominant hand and table 3 shows the mean and standard deviation of some quantitative variables among persons with and without ache. This study showed that in bivariate analysis the neck pain is related to dominant hand, age marriage duration and number of children (P<0.05) and shoulder, back and wrist pain are related to educational level, age, weight, marriage duration (P<0.05). In addition the shoulder pain was related to number of children and dominant hand, and also the wrist pain was related to dominant hand (P<0.05) (Table 2 and 3).

To control the confounders and multivariate analysis we used multiple logistic regressions. Table 4 presents the results of the logistic regression model for musculoskeletal symptoms. Based on the results of logistic regression the prevalence of musculoskeletal disorders were not different between the cities and different parts of Iran. However, the possibility of pain in neck was related to husband's job (governmental compared to self-employed OR=1.6, CI95%:1.09-2.63), older age (OR=1.06, CI95%:1.01-1.11), higher height (OR=1.09, CI95%:1.03-2.09), and more marriage duration (OR=1.08, CI95%:1.01-2.05), the possibility of pain in back was related to educational level[guidance (OR=0.38, CI95%:0.15-0.95) and high school (OR=0.31, CI95%:0.13-0.94) compared to primary school] and heavier weight (OR=1.07, CI95%:1.04-2.19). Finally the possibility of pain in shoulder was related to dominant hand [right hand compared to both hand (OR=4.6, CI95%:1.2-17.8)]. Otherwise, the possibility of pain among older women, women that their husbands have governmental employment, taller women and women with long marriage duration was more than the others (Table 4).

Table 2: The prevalence of musculoskeletal symptoms and pain in different regions based on some studied qualitative variables among a group of Iranian housewives

Regions	Pain	Education N (%)		P	Husband job N (%)		P	Dominant hand N (%)		P
Neck	Yes	Primary	128(53.1)		Government employment	162(54.5)		Both	17(65.4)	
		Guidance	40(55.6)		Self employed	122(49.2)		Left hand	82(63.6)	
		High school	85(52.8)					Right hand	204(48.8)	
		University	53(48.6)	0.8			0.2			0.006
	No	Primary	113(46.9)		Government employment	135(45.5)		Both	9(34.6)	
		Guidance	32(44.4)		Self employed	126(50.8)		Left hand	47(36.4)	
		High school	76(47.2)					Right hand	214(51.2)	
		University	56(51.4)							
Shoulder	Yes	Primary	127(59.6)		Government employment	122(47.3)		Both	81(78.3)	
		Guidance	30(45.5)		Self employed	104(46.6)		Left hand	54(68.4)	
		High school	58(40.8)					Right hand	176(43.5)	
		University	34(35.8)	0.001			0.8			0.0001
	No	Primary	86(40.4)		Government employment	136(52.7)		Both	5(21.7)	
		Guidance	36(54.5)					Left hand	25(31.6)	
		High school	84(59.2)					Right hand	229(56.5)	
		University	61(64.2)		Self employed	120(53.6)				
Back	Yes	Primary	134(71.3)		Government employment	146(67.0)		Both	18(78.3)	
		Guidance	45(76.3)		Self employed	136(64.5)		Left hand	53(71.6)	
		High school	76(59.4)					Right hand	232(64.8)	
		University	53(60.9)	0.03			0.5			0.25
	No	Primary	54(28.7)		Government employment	72(33.0)		Both	5(21.7)	
		Guidance	14(23.7)		Self employed	75(35.5)		Left hand	21(28.4)	
		High school	52(40.6)					Right hand	126(35.2)	
		University	34(39.1)							
Wrist	Yes	Primary	112(58.3)		Government employment	113(49.1)		Both	15(62.5)	
		Guidance	25(43.9)		Self employed	106(50.5)		Left hand	58(64.4)	
		High school	68(50.0)					Right hand	168(47.5)	
		University	38(42.7)	0.02			0.7			0.009
	No	Primary	80(41.7)		Government employment	117(50.9)		Both	9(37.5)	
		Guidance	32(56.1)		Self employed	104(49.5)		Left hand	32(35.6)	
		High school	68(50.0)					Right hand	186(52.5)	
		University	51(57.3)							

Table3: The mean and standard deviation of some quantities variables among a group of Iranian housewives with and without pain

Regions	Pain	Age Mean (SD)	P	Weight Mean (SD)	P	Height Mean (SD)	P	BMI Mean (SD)	P	Marriage duration Mean (SD)	P	Number of children Mean (SD)	P
Neck	Yes	41.2(12.3)		70.5(11.8)		161.1(12.7)		26.4(6.03)		23.9(12.7)		2.7(1.5)	
	No	38.8(12.6)	0.021	69.8(12.9)	0.49	16.3(10.3)	0.5	26.8(4.8)	0.4	18.2(13.04)	0.0001	2.3(1.5)	0.013
Shoulder	Yes	43.1(12.2)		71.7(13.5)		161.3(7.5)		27.1(6.0)		23.8(13.6)		2.7(1.7)	
	No	37.9(12.3)	0.0001	69.0(11.3)	0.023	160.7(10.1)	0.45	26.6(4.1)	0.31	18.1(12.9)	0.0001	2.4(1.4)	0.029
Back	Yes	41.7(12.25)		71.9(13.06)		161.0(13.2)		27.19(5.58)		21.53(12.99)		2.65(1.7)	
	No	38.1(13.11)	0.004	67.2(11.8)	0.001	159.5(11.3)	0.3	25.9(5.05)	0.051	18.7(13.9)	0.041	2.39(1.44)	0.14
Wrist	Yes	42.4(12.9)		71.4(13.6)		160.6(14.2)		26.9(5.88)		23.06(13.72)		2.67(1.7)	
	No	37.2(12.06)	0.0001	68.6(11.5)	0.03	160.5(10.61)	0.96	26.5(4.47)	0.46	18.19(12.5)	0.0001	2.42(1.51)	0.11

Table 4: The results of the logistic regression Model for musculoskeletal symptoms (as a dependent variable) and studied independent variables

Dependent Variables	Independent variable		β	S.E of β	OR	CI 95% OR	P
Neck	City	Yazd*			1		
		Kashan	0.31	0.36	1.36	0.67-2.7	0.38
		Karaj	0.26	0.35	1.3	0.64-2.6	0.45
	Education	Primary*			1		
		Guidance school	0.34	0.39	1.41	0.65-3.0	0.37
		High school	-0.1	0.46	0.89	0.35-2.2	0.81
		University	-0.02	0.34	0.97	0.5-1.8	0.93
	Husband job	Government employment*			1		
		Self employed	-0.47	0.24	0.62	0.38-0.91	0.05
	Dominant hand	Both*			1		
		Left hand	-0.13	0.63	0.87	0.24-3.04	0.82
		Right hand	-0.13	0.53	0.87	0.3-2.5	0.80
	Age		0.06	0.02	1.06	1.01-1.11	0.009
	Weight		0.01	0.01	1.01	0.99-1.03	0.17
	Height		0.03	0.01	1.09	1.03-2.09	0.03
	Married duration		0.10	0.02	1.08	1.01-2.05	0.001
	Number of children		0.11	0.11	1.12	0.89-1.42	0.31
Back	City	Yazd*			1		
		Kashan	-0.36	0.38	0.69	0.32-1.47	0.34
		Karaj	-0.12	0.40	0.88	0.39-1.96	0.76
	Education	Primary*			1		
		Guidance school	-0.94	0.46	0.38	0.15-0.95	0.04
		High school	-0.88	0.58	0.31	0.13-0.94	0.03
		University	-0.39	0.37	0.67	0.32-1.39	0.28
	Husband job	Government employment*			1		
		Self employed	-0.366	.284	0.69	0.39-1.20	0.19
	Dominant hand	Both*			1		
		Left hand	0.06	0.7	1.06	0.26-4.27	0.92
		Right hand	0.21	0.58	1.23	0.38-3.92	0.71
	Age		0.002	0.029	1	0.94-1.06	0.94
	Weight		0.028	.013	1.07	1.04-2.19	0.03
	Height		-0.014	.020	0.98	0.94-1.02	0.47
	Married duration		0.01	0.03	1.01	0.96-1.08	0.54
	Number of children		-0.09	0.14	0.9	0.68-1.19	0.47
Shoulder	City	Yazd*			1		
		Kashan	-0.14	0.36	0.86	0.42-1.78	0.70
		Karaj	.05	0.36	1.05	0.51-2.15	0.88
	Education	Primary*			1		
		Guidance school	-0.60	0.43	0.54	0.23-1.27	0.16
		High school	-0.02	0.50	0.98	0.36-2.62	0.96
		University	-0.27	0.36	0.75	0.36-1.55	0.44
	Husband job	Government employment*			1		
		Self employed	-0.311	0.257	0.73	0.44-1.21	0.22
	Dominant hand	Both*			1		
		Left hand	1.04	0.77	2.84	0.62-13.0	0.17
		Right hand	1.53	0.68	4.66	1.2-17.79	0.02
	Age		0.05	0.02	1.05	0.99-1.11	0.07
	Weight		-0.00	0.01	0.99	0.97-1.01	0.68
	Height		0.00	0.018	1.00	0.96-1.03	0.93
	Married duration		0-.06	0.03	0.94	0.88-0.99	0.06
	Number of children		0.05	0.12	1.05	0.82-1.35	0.65
Wrist	City	Yazd*			1		
		Kashan	0.27	0.36	1.31	0.64-2.69	0.45
		Karaj	0.70	0.39	2.02	0.92-4.39	0.07
	Education	Primary*			1		
		Guidance school	-0.30	0.43	0.73	0.31-1.72	0.48
		High school	0.46	0.54	1.58	0.54-4.59	0.39
		University	-0.40	0.36	0.66	0.32-1.36	0.26
	Husband job	Government employment*			1		
		Self employed	-0.17	0.26	0.84	0.49-1.42	0.52
	Dominant hand	Both*			1		
		Left hand	0.056	0.65	1.05	0.29-3.84	0.93
		Right hand	0.31	0.54	1.36	0.47-3.95	0.56
	Age		-0.01	0.02	0.98	0.94-1.04	0.66
	Weight		0.01	0.01	1.01	0.96-1.01	0.31
	Height		0.01	0.02	1.03	0.95-1.02	0.61
	Married duration		0.036	0.027	1.05	0.91-1.01	0.19
	Number of children		0.210	0.130	1.234	.95-1.59	0.1

*Reference group

It must be mentioned that there were no response for some of the variables (according to the presented results in tables 1 and 2) and some of the subjects were reluctant to response to some of the questions in Nordic questionnaire and some demographic variables. Therefore, we have missing values due to not responding and the total sample was not equal to 600 in some cases.

DISCUSSION

The previous researches have generally focused on the traditional work exposures in occupational settings, but recently occupational health researches focus on exposures in non-traditional occupational settings, such as the home and neighborhood environment.[17-19] Therefore, present study assessed the prevalence of MSDs in non-occupational settings (at home). This study showed that the prevalence of MSDs is high among Iranian housewives so that about 40% to 52% of the women reported pain in different part of their body. Pensri reported that 42% of adult female populations in Japan suffer from MSDs.[20] Although there is no study about the prevalence of MSDs in public population in Iran, but the high prevalence of MSDs among Iranian housewives suggests that housework could be an independent risk factor contributing to the development of musculoskeletal disorders among women. Another reason for this result could be due to some essential biomechanical parameter and features of housework such as child care, care-giving, food preparation and cleaning that paid for doing them at home in Iranian women.[21]

Homemakers may engage in prolonged standing and repetitive hand movements during food preparation and dish-washing. Similarly, women frequently perform household tasks such as mopping/cleaning in narrow or difficult to reach spaces that require awkward postures including bending, kneeling and squatting. Therefore, musculoskeletal pain among housewives could be associated with awkward work postures or repetitive hand movements. This finding is in line with some literature discussing work exposures related to musculoskeletal pain.[22] On the other hand doing hard work at home without participation of other family members required more time for doing work and more power exertion that lead to exhaust during work at home.[23] Thus, these factors also could affect the women's body posture at home and consequently incidence and prevalence of MSDs. It could be concluded that due to traditional method for doing tasks at Iranian homes and not using of mechanical tool like vacuum cleaner, cloth washing machine and dishwasher machine, the women have to do a lot of tasks that involved different parts of their body.

This study suggests that the prevalence of pain and disorders increase with increasing age, Weight, Height, Married duration, number of children and with low educational level. As age increase, the vertebral disks get more susceptible to injuries because of hard work and physical stress and usually the weight is increase along with age, so these results are anticipated. However, the heavy weight and high height are other factors that chronically can cause MSDs. As weight and height increase especially when subjects get obesity, because of increasing in compressing force on vertebral disks and muscles, the probability of MSDs is increased. This result is parallel with the previous study around the world.[24-26]

The result of this study is consistent with Aghili's study who found that there is a significant association between

prevalence of MSDs and educational level, marital status and number of children.[27] However, in a previous study in Iran, there was no significant association between MSDs and the number of children but the authors found a significant relationship between MSDs in housewives and used equipment in household chores.[28]

Married duration as another factor, due to increase in doing task duration and paying additional force in this period of time could be positively related to prevalence of MSDs. These results are in accordance with the results of Habib and Rima.[3,29] At the present study higher educational level was reversely associated with MSDs. It seems that subjects, who have high educational degree, probably have got more information about ergonomic issues and keeping body in proper posture from different sources, whereby she can apply this information at her home to prevent MSDs.

Based on the results of this study the prevalence of musculoskeletal disorders were not different between the cities and different parts of the Iran. The Iranian housewives at home do different functions and tasks, and this status is same in different areas in Iran. Hence, there are no statistically significant relationships between the prevalence of MSDs in different regions of Iran.

In this study, the prevalence of shoulder pain in right-handed women was more common than left-handed women that could be due to overusing of right hand among participants in present study. As another result of this study, the prevalence of neck pain among housewives who's their husband had governmental job was more than the others. Although in the past there was a patriarchal culture in Iran, but today, if men have free time, usually help their wife at home. However, the men with

self-employed job can spend more time at home to help their wife for sharing works with them. Thus, the lower prevalence of MSDs in some parts of the body among housewives who's their husband have governmental job is anticipated.

CONCLUSION

This study found the prevalence of MSDs to be high among Iranian housewives that probably could be due to awkward body postures. In this study the symptoms were also related to cultural, social and individual factors. This research is the one of the few epidemiological studies in Iran to explore associations between ergonomic stressors and MSDs in homemakers. Therefore, ooccupational health professionals must continue to include housework and homemakers within their research and policy agendas. In particular, future studies might explore the interaction between specific occupations, housework and specific musculoskeletal symptoms. The analysis of these findings points that there are structural determinants such as social norms that can cause to the high level of women's involvement in domestic chores. However, it seems that sharing household tasks among family members could prevent MSDs among housewives efficiently.

CONFLICT OF INTEREST

There is no Conflict of interest in this study.

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