

Cardiovascular Risk Profile as Related to Type of Work in Siwa

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ABSTRACT A cross-sectional study was carried out to study the conventional cardiovascular risk profile with special emphasis on hypertension and the relation to physical activity type of work, in Siwa community, as an example of underserved locations. A community based study targeting adult population of Siwa (25 years old and above) was conducted by members of the health convoy prepared by HIPH to Siwa Oasis. A cluster sampling technique was adopted randomly covering all districts of Siwa. The study included 202 respondents. The participants were interviewed using a pre-designed questionnaire including personal and long term enquiry of medical data, and dietary habits. Using standard methods, blood pressure was measured and blood samples were taken to test for the levels of cholesterol and thyroid stimulating hormone (TSH). Results showed that 48% of the studied population were hypertensives and 64% had less active work. Multiple regression models, with systolic blood pressure (SBP) and diastolic blood pressure (DBP) as quantitative dependent variables, showed that the physical type of work was a significant independent factor in both models ($p=0.003$). Significant higher percents of smokers, overweight and obese, hyper-cholesterolemics, and hypothyroid cases were reported among less active work, in comparison to active work ($p=0.006, 0.0001, 0.002, \text{ and } 0.004$, respectively). In conclusion, cardiovascular risk factors are emerging at high rates in this community. Type of work physical activity seems to be an important risk factor that should be considered in preventive programs.

Key words: *Cardiovascular risk, Type of work, Active work, Siwa*

INTRODUCTION

It has been known since long time that there are some peculiar health problems for desert communities in Egypt like Siwa; including hypothyroidism and some congenital disorders.⁽¹⁾ However, with the current epidemiological transition, a slow epidemic of all the life-style diseases is emerging to invade even these closed communities, changing its disease pattern without matched improvement in health

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services.^(2, 3)

Type of work represents one of the key mediators of life style changes, particularly in closed communities.⁽⁴⁾ Changing from active manual to sedentary mechanized work was reported to increase cardiovascular risk factors particularly hypertension.^(5, 6) On the other hand, work is an interactive environment influencing acquired knowledge, attitude and practice (KAP) about health in general and cardiovascular risk in particular, in western communities⁽⁷⁾ as well as in our communities.⁽⁸⁾

The profile of cardiovascular risk factors is the most vulnerable to react with concomitants of socioeconomic developments with subsequent increase in the prevalence of hypertension, obesity, dyslipidemia, smoking, diabetes and sedentary life.⁽⁹⁾

The Egyptian National Hypertension Project (NHP) among adults aged 25 years

of age and more, reported high prevalence rates among males (25.7%) and females (26.9%). The problem is more pronounced in low socioeconomic areas.⁽¹⁰⁾ Another issue is the thyroid dysfunction which may be prevalent in Siwa.⁽¹⁾ It is an important factor that may affect serum cholesterol level, cardiovascular risk and physical ability to work.⁽¹¹⁾ Definition of the interacting risk factors is the cornerstone for cardiovascular disease prevention and control in underserved locations, considering their special lifestyle and work characteristics.

The present study was designed to investigate the conventional cardiovascular risk profile with special emphasis on hypertension, KAP about it and physical activity type of work in Siwa community, as an example of underserved locations.

MATERIAL AND METHODS

Study setting: Siwa Oasis.

Study design: A cross-sectional

community based study targeting adult population of Siwa (25 years old and above) was conducted by members of the health convoy prepared by HIPH to Siwa Oasis. A cluster sampling technique was adopted randomly covering the eight districts of Siwa.

Sample size: The total number of respondents included in the study amounted to 202 (Based on the results of Egyptian NHP, assuming prevalence of hypertension =26%, degree of precision =6 and alpha level of 0.05, a minimal required sample size was calculated to be 203 from the 25000 Siwa population).

Data collection: The participants were interviewed using a pre-designed questionnaire including data about their age, sex, type of work, personal and family history of heart diseases (presence of hypertension and/ or coronary artery disease (CAD) in a first degree relative below 55 years of age) and history of

diabetes mellitus (DM). The type of work was classified according to the long term physical performance criteria of each occupation into: active and less active work.⁽¹²⁾ The life style pattern regarding smoking, salt and fatty diet consumption were enquired according to the WHO guidelines.⁽¹³⁾ Also, three questions were asked to assess their knowledge, attitude and practice towards hypertension. Weight and height were measured and body mass index (BMI kg/m²) was calculated.⁽¹⁴⁾ Blood pressure was measured twice in immediate succession, using a standard adult cuff on the right arm after the person was seated for five minutes. The mean of the two readings was used in the study. Hypertension was defined as history of antihypertensive treatment, or a level of systolic BP ≥ 140 mm Hg, and/ or diastolic BP ≥ 90 mm Hg. Using standard methods, blood samples were taken to test for the levels of cholesterol and thyroid stimulating

hormone (TSH). The normal level of TSH ranged between 0.27-4.20 mU/l.⁽¹⁵⁾

Hypercholesterolemia was defined as total cholesterol level \geq 200 mg/dl.⁽¹¹⁾

Statistical analysis of the results was performed using SPSS version 16. Chi square was used for comparison between proportions. Multiple linear regression models with systolic and diastolic BP as quantitative dependent variables were done to investigate the significance of the type of work after adjustment for other significant variables. In the models, the categorical variables with two outcomes were expressed as a dummy variable ($v=0$ & 1). Significance was considered if

$P < 0.05$.

RESULTS

Characteristics of the studied population

The present study included 202 Siwa residents. Their age ranged from 25 to 70 years. Males comprised 33.6% of the sample. Figure (1) demonstrates that 48% of the study sample were hypertensive; either unaware (11%), aware and uncontrolled (7%) or aware and controlled (30%). Moreover, figure (2) reveals that 36% had active work (agricultural or manual), while 64% had less active work (clerks, commercial business or household activities).

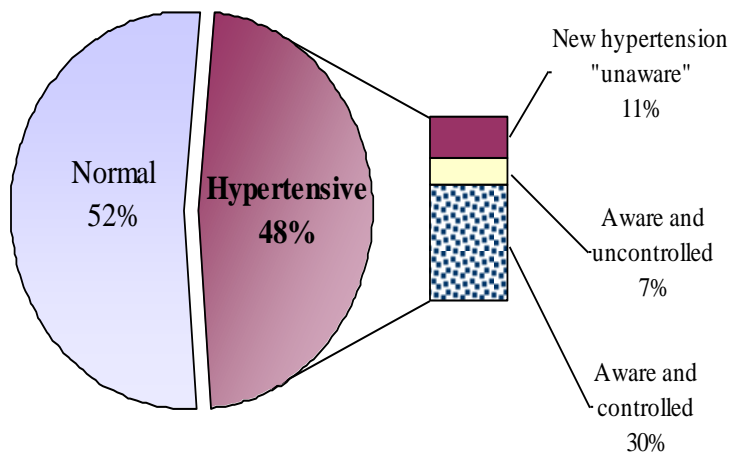


Figure (1): Distribution according to awareness & management of hypertension

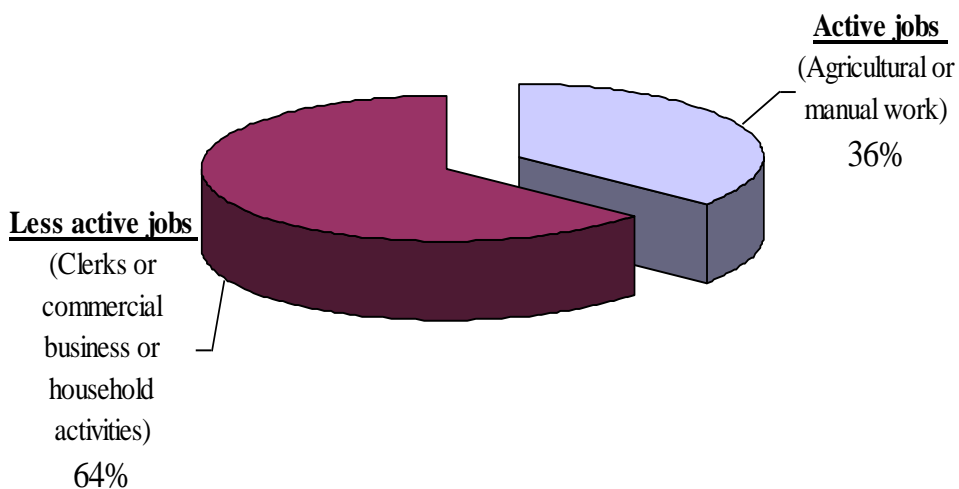


Figure (2): Distribution according to Type of work

Factors associated with hypertension

Table (1) reveals that neither age nor sex distributions differed significantly between hypertensives and normotensives. The table reveals that hypertensives were of a higher percent among those with less active Jobs, yet the difference was not statistically significant ($p=0.094$).

It also shows that those with no salt intake and those with high salt intake had higher percents of hypertension (100% and 53.5%, respectively) than those with minimum and moderate intake ($p=0.033$). There was no statistically significant difference in the distribution of hypertensives according to degree of fat consumption.

Table (1): Characteristics of Normotensives and Hypertensive

Characteristic	Blood pressure				Total		X ² , P
	Normal		Hypertensive		Total		
	No.	%	No.	%	No.	%	
Age							
25-	70	52.6	63	47.4	133	100	2.34, 0.504
40-	12	60.0	8	40.0	20	100	
50-	12	40.9	17	59.1	29	100	
60+	12	60.0	8	40.0	20	100	
Sex							
Male	30	44.1	38	55.9	68	100	2.80, 0.090
Female	76	56.7	58	43.3	134	100	
Type of work							
Active work	44	60.3	29	39.7	73	100	2.79, 0.094
less active work	62	48.1	67	51.9	129	100	
Salt intake							
No salt intake	0	0.0	4	100.0	4	100	8.7*, 0.033
Minimum	40	48.1	44	51.9	84	100	
Moderate	51	62.5	31	37.5	82	100	
High	15	46.5	17	53.5	33	100	
Fat intake							
Minimum	45	50.8	44	49.2	89	100	0.52, 0.772
Moderate	45	55.8	36	44.2	81	100	
High	16	50.0	16	50.0	32	100	
Total	106	52.5	96	47.5	202	100	

* Significant at 95% CI

Knowledge, attitude and practice (KAP) about hypertension

Table (2) clarifies that correct knowledge about hypertension was significantly higher ($p=0.046$) among hypertensives (41.7%) than among normal (28.3%), yet both are considered of low percentages. There was no difference ($p=0.926$) between both groups as regards their beliefs of the harm caused by hypertension. It also clarifies

that only 24.3% of the sample measured their blood pressure at least once annually.

Those with hypertension had a significant higher percent measuring their blood pressure than those with normal blood pressure (32.3% vs. 17%), ($p=0.01$). This KAP questionnaire was also tested in relation to physical type of work and no significant differences detected.

Table (2): Knowledge, Attitude and Practice about Hypertension

Characteristic	Blood pressure				Total		χ^2 , P
	Normal		Hypertensive		No.	%	
	No.	%	No.	%			
Knowledge about hypertension should be associated with headache							
Yes	76	71.7	56	58.3	132	65.3	3.97* , 0.0462
No	30	28.3	40	41.7	70	34.7	
Belief that hypertension could cause harm to body organs							
Yes	57	53.8	51	53.1	108	53.3	0.01 , 0.926
No	49	46.2	45	46.9	94	46.7	
Annual measurement of blood pressure							
Yes	18	17.0	31	32.3	49	24.3	6.43* , 0.011
No	88	83.0	65	67.7	153	75.7	
Total	106	100	96	100	202	100	

* Significant at 95% CI

Cardiovascular risk profile of the studied population

As shown in table (3), non smokers had a higher percent of hypertension (56.8%) than had smokers (40.4%), ($p=0.02$). Those with positive family history of heart diseases had a higher percent of hypertension (53.4%) than those with no family history (42.4%), the difference was not statistically significant ($p=0.132$). Overweight and obese had a higher percent of hypertensives (49.8%) than did those of $BMI < 25$ (43.6%), yet this was not statistically significant ($p=0.374$).

It also shows that the prevalence of

hypercholesterolemia was about 46%, hypertensives were about 47% of hypercholesterolemics compared to 43.2% of those with normal cholesterol level, yet this was not statistically significant ($p=0.668$). The prevalence of DM in the study population was 18%, hypertensives were about 61% of diabetics versus about 45% of non-diabetics with statistically insignificant result ($p=0.059$).

As regards thyroid function, elevated TSH was detected in 6.6% of investigated population. There was no significant difference in the distribution of hypertensives according to TSH level ($p=0.936$).

Table (3): Cardiovascular Risk Profile in relation to Hypertension

Characteristic	Blood pressure				Total		X ² , P
	Normal		Hypertensive		No.	%	
	No.	%	No.	%			
Smoking							
No	38	43.2	50	56.8	88	100	5.40* , 0.02
Yes	68	59.6	46	40.4	114	100	
Family history of heart diseases							
Yes	44	46.6	50	53.4	94	100	2.26, 0.132
No	62	57.6	46	42.4	108	100	
BMI (n=202)							
<25	44	56.4	34	43.6	78	100	0.79 , 0.374
25+	62	50.2	62	49.8	124	100	
Cholesterol (n=138) ^a							
Hypercholesterolemia	34	53.1	30	46.9	64	100	0.18 , 0.668
Normal	42	56.8	32	43.2	74	100	
DM (n=202)							
Diabetic	14	38.8	22	64.2	36	100	3.56 , 0.059
Non-diabetic	92	55.4	74	44.5	166	100	
TSH (n=180) ^b							
Increased	6	50.0	6	50.0	12	100	0.01 , 0.936
Normal	86	51.2	82	48.8	168	100	
Total	106	52.5	96	47.5	202	100	

* Significant at 95% CI

^{a, b} The rest of the sample couldn't be investigated due to insufficient sample

Adjustment for potential confounders

The previously investigated parameters were examined in multivariate regression models with systolic BP and diastolic BP as quantitative dependent variables in the studied population. Age, sex, type of work, family history of heart diseases, Knowledge, attitude and practice about hypertension, some daily habits (smoking, salt and fat intake), BMI, cholesterol and TSH levels were included as independent

factors at the models. (As presented in table 4).

The type of work (either active or less active work) was found to be the only significant factor in the model of systolic BP

($p=0.003$), while the significant factors of the model of diastolic BP were; type of work, smoking, positive family history of heart disease and lastly, wrong knowledge about hypertension.

Table (4): Multiple Regression Models with Systolic BP and Diastolic BP as Dependent Variables

	B	Std. Error	t	P
Systolic BP Model				
Constant	131.074	36.289	3.612	.001
Type of work	48.141	14.750	3.264	.003
Diastolic BP Model				
Constant	71.982	15.132	4.757	.000
Type of work	20.583	6.150	3.347	.003
Smoking	23.784	8.697	2.735	.011
Family history of heart disease	14.194	5.744	2.471	.021
Knowledge about hypertension should be associated with headache	24.284	6.401	3.794	.001

Effect of the type of work on some risk

factors

Table (5) reveals the significant higher percents of; smokers (63.6% vs 43.8%), overweight and obese (76.7% vs 34.2%) and hypercholesterolemic (56.5% vs 30.2%) among those with less active work than

among those with active work ($p<0.01$). All of those investigated who had active work had normal levels of TSH, while 10.8% of those having less active work had high levels of TSH. The difference was statistically significant ($p=0.004$).

Table (5): Effect of the Type of Work on some Risk Factors

Characteristic	Type of work				Total		X ² , P
	Active work (n=73)		less active work (n=129)		No.	%	
	No.	%	No.	%			
Smoking							
No	41	56.2	47	36.4	88	43.6	7.38* , 0.006
Yes	32	43.8	82	63.6	114	56.4	
BMI (n=202)							
<25	48	65.8	30	23.3	78	38.6	35.52* , 0.0001
25+	25	34.2	99	76.7	124	61.4	
Cholesterol (n=138) a							
Hypercholesterolemia	16	30.2	48	56.5	64	46.4	9.07* , 0.002
Normal	37	69.8	37	43.5	74	53.6	
Total	53	100	85	100	138	100	
TSH (n=180) b							
Increased	0	0.0	12	10.8	12	6.7	7.99* , 0.004
Normal	69	100.0	99	89.2	168	93.3	
Total	69	100	111	100	180	100	

* Significant at 95% CI

a, b The rest of the sample couldn't be investigated due to insufficient sample

DISCUSSION

Siwa community is still in the early phase of socioeconomic development with its peculiar stresses. Work is the main value of the community, where it reflects a great part of their socioeconomic status, life style and culture.⁽¹²⁾

The type of work may be classified into; physically active including agricultural and other manual work, or less active involving sedentary and mild physical activity. Although, there was no statistically significant difference between active and less active work in the studied Siwa population, yet there is a tendency to shift from active to less active work. This is one of the early signs of urbanization with its negative health consequences.⁽²⁾

The prevalence of hypertension was

investigated in the studied population as the first step in cardiovascular risk stratification of this community according to the most recent guidelines for cardiovascular disease (CVD) prevention (ESH, ESC 2007).⁽¹¹⁾ The estimated rate for hypertension was 48% of the studied population. This rate is much higher than that reported by NHP (26.3%).⁽¹⁰⁾ Other studies from suburban and rural communities undergoing epidemiological transition, reported similar high rates of hypertension.^(5,8,16) The significant high salt intake among hyperstensives in this community may be a contributing factor for is high prevalence. There was no significant effect for age, sex or fat intake on hypertension in this study possibly due to small sample size.

Based on our data, it is obvious that the rate of awareness among hypertensives approached about 77%; also, the control rate of hypertension due to treatment was

62.5% of the hyperstensives representing an advantage for this community. Also, correct knowledge about hypertension and annual measurement of blood pressure were significantly higher among hypertensives than among normals. This may be one of the positive inputs of frequent medical convoys and improvements of health services in this closed community. However, in this study the reported rates of KAP about hypertension are still in need for more improvement to match with the observed high rates of the disease. Therefore, correct KAP about cardiovascular risk factors should be promoted whenever possible and worksite health educational activities seems to be a reasonable tool.⁽¹⁷⁾ In the present study, the different cardiovascular risk factors co-existed with hypertension at high rates. Hypertension was present in about 40% of smokers, 50% of overweight and obese, 47% of

hypercholesterolemics, 53% of those with family history of heart diseases, 61% of diabetics and 50% of hypothyroid cases. Smoking was the only significant variable with higher rate of non smokers among hypertensives possibly due to high rate of awareness about hypertension in this community. However, all other risk factors represent a real emerging problem. Co-existence of multiple cardiovascular risk factors have been reported to increase the CVD morbidity and mortality.⁽¹⁸⁾

Reduction of the mean blood pressure of the community greatly reduces total cardiovascular risk.⁽¹¹⁾ Therefore, multivariate analysis models with systolic BP and diastolic BP as dependent variables were constructed. This demonstrated that less active type of work was the independently significant factor with effect on both models. Our finding is going with the assumption that, BP is liable to increase in occupations involving

sedentary work as compared to those involving physical activity.^(4,5) Other independent variables that were significant in relation to diastolic BP in our model were; smoking, family history of heart disease and wrong knowledge about hypertension. These factors may perhaps affect the peripheral vascular resistance which is the main pathophysiological mechanism for increase in diastolic BP.^(11, 19)

In the current study, type of work was associated with cardiovascular risk factors in terms of higher rates of smoking, overweight and obesity, hypercholesterolemia and hypothyroidism among less active work in comparison to active work. This is going with the assumption that cardiovascular risk of physical inactivity at work may extend beyond BP elevation to hazardous effects on promoting smoking behavior, body weight gain, cholesterol elevation and maladjustment of neuro-hormonal

profile.^(11, 20)

Hypothyroidism, as judged by elevated TSH level, was reported only among 6.6% of the investigated population which is much less than that previously reported, since it was known that goiter and iodine deficiency were endemic in Siwa.⁽¹⁾ Reduction in the rate of thyroid dysfunction is attributable to iodine supplementation. On the other hand, hypothyroidism is related to increased cardiovascular risk due to the associated hypercholesterolemia. The significant relation between hypothyroidism and less active work may be a cause rather than an effect possibly due to associated poor energy and easy fatigability.^(10,21)

Limitation of the study: A limitation of this study is the small sample size that was calculated assuming a 26% prevalence of hypertension according to NHP data which had not included similar population. The observed prevalence was higher than

expected thus decreasing the power of the present study. So it is recommended to consider this as an exploratory research work that gives insight of the given situation for proceeding studies of larger sample size, that can avoid the effect of using weights for simulation of replication to reach the desired precision, and to be able to increase the scope of the research thus including more risk factors in the models.

CONCLUSION AND RECOMMENDATIONS

Cardiovascular risk factors are emerging at high rates specially hypertension, smoking, overweight and obesity, hypercholesterolemia and diabetes, with high percent of co-existence. These life style induced factors are changing the disease pattern in Siwa.

The type of work seems to be an important determinant factor for cardiovascular risk in this community. Physical activity at work should be

encouraged and suitable systems of work with reasonable manual part should be promoted for this community.

Early prevention and control programs of cardiovascular risk factors are essential tools for health development. Educational programs to improve KAP about heart disease should be emphasized. Thyroid dysfunction is still in need for proper management in this community. Also, further studies on wide-scale with inclusion of other cardiovascular risk factors should be considered.

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