Galore International Journal of Health Sciences and Research
Vol.2; Issue: 1; March 2017
Website: www.gijhsr.com
Original Research Article *P-ISSN: 2456-9321*

Designing Cardiovascular Disease Management Model for Drivers of Iran during 2006-2015

Majid Tajik[1], Fereidoun Nouhi[2], Mokhtar Malekpour[3], Akbar Nikpajoh[4], Komeil Mahjouri[5]

[1]PhD Candidate of Health management, Shakhes Pajouh Research Institute, Isfahan University, Tehran, Iran
[2]Professor, Research Center of Shahid Rajaei University, Department of Cardiovascular Diseases, Tehran, Iran,
[3]Professor, Isfahan Medical Sciences University, Department of Exceptional Children, Isfahan, Iran,
[4]Assisstant Professor, Research Center of Shahid Rajaei Hospital, Department of Cardiovascular Prevention Research, Tehran, Iran,
[5]PhD Candidate of Agricultural Economics, University of Mashhad, Advisor of Statistics,

Corresponding author: Majid Tajik

ABSTRACT

Background: This study aimed to evaluate the risk factors among drivers due to the nature of the job, mostly in groups considered at high risk in order to design cardiovascular disease management model that is a necessity for our country.
Method: This is an applied study in terms of objective; it is also a survey study. Data analysis method is correlational regression analysis. The main risk factors for cardiovascular disease include data variables, demographic and geographical characteristics. we analyze data by T test and correlation coefficient; in order to test the first hypothesis, ANOVA was used. F value was used to test the hypotheses, and path analysis (estimating by partial least square method) was used to test other hypotheses. In the next step in the modeling, refining and final variables were used to evaluate the model. Finally, the proposed model was applied.
Findings: Studies have shown that the average age of drivers was 40.97 years old, the average of work experience was 11.82, and the average of BMI was 27.2 kg/m2 that showed an overweight. According to mean values of 80.4 for diastolic pressure, and 117.2 for systolic pressure, the drivers are at risk high blood pressure. The average value of TG (triglycerides) equaled 169.5. And the average value of CHOL equaled 184.2 that is over 150, so in this respect, the drivers are at the border risk. The average value of FBS equaled 93.02 close to the risk and the deppression equaled 47.93, and the average standard of health is 30-70. The average of smoking equaled 3.46. Also according to results of heart disease, on average, 8.22 percent of drivers suffer heart disease. The main components of risk factors include abdominal fat mass, diastolic blood pressure, depression, fbs, cigar and triglycerides and geographical factors affecting risk factors including air temperature and humidity rate. Principal component associated demographic risk factors include age and experience in driving.
Conclusion: The results show that the relationship between demographic variables and risk factors is positive and significant in the sense that the main risk factors among drivers are ages and experience of work.
The results have shown that the relationship between the two variables of geographical features and risk factors is negative and significant. The results related to the relationship between risk factor and heart disease is positive and significant; this means that there is a relationhip between the model of health management and reduction of cardiovascular disease. This kind of analysis can be helpful in setting realistic goals, diagnosis and prediction of risk factors and management and futurists of officials; this model can be also effective for other diseases and related topics in the field of Health and Medical Education.

Keywords: cardiovascular disease, National model, drivers

INTRODUCTION

In many countries, non-communicable diseases have the upward trend that are the main causes for the increase in life expectancy, higher and longer exposure to risk factors and change

the pattern of life. Non-communicable diseases in 1990 in terms of global burden of disease have ranked in the fifteenth, while estimates show that it increased to six ranks in 2020. [1]

The prevalence of these diseases in developing countries, including our country, increased the burden of cardiovascular disease and its consequences are significant, so that cardiovascular disease is the first cause of death in Iran. [2] Despite increasing awareness of people about the need to prevent heart disease and planning by governments in this regard have done, every day the number of people due to cardiovascular problems, the health centers come in, they added. Some of these people with heart disease lose their lives and those who survive must take medication for a long time. This condition affects the daily life of patients and their families. [3] Of course, for better and more accurate planning, it is required that the managers have a viewpoint to the vision of cardiovascular disease, especially ischemic heart disease in the community. To achieve this and due to many restrictions on collecting statistics and detailed information, modeling is one of the most common methods for evaluating the current situation and forecasts in the future. In this way, it is tried to design a model of mental illness in the community and then, by entering parameters, subjective elements are interconnected. After evaluating the accuracy of the information derived from the model, not only we can discuss on the model predictions, but also by changing parameters in the range of appropriate and acceptable, the effects of general and disease burden in community are estimated. [4] The case study of this research includes the drivers of Isfahan province. As said the occupational or social groups are at risk for cardiovascular diseases. [5]

Since cardiovascular disease due to the nature of the job drivers as high risk are likely more common and, according to domestic and global mortality, heart diseases are increasing, so that mortality statistics increase to nearly 23 million in 2030. [6] The result on the one hand leads to high costs for the individual and society; On the other hand, many human losses are entered into the system. It tries to assess the causes and management strategies to solve the problem if we neglect seamlessly. Investment in research, early deaths and disabilities and mental health and quality of life and well being to reduce driving and improves community. [7] According to the above explanations and to estimate the incidence of cardiovascular disease in drivers and determining the main risk factors for cardiovascular disease, designing a model that can be used to plan and manage cardiovascular disease in drivers.

Then the hypotheses of the conceptual model and in order to achieve the research objectives based on the formulation of the management of cardiovascular diseases drivers between the city, the hypotheses and research questions based on the data, the health status of drivers of provinces and inferential statistics were used.

Thus we find that if the demographic factors, geographical features and risk factors of cardiovascular disease with risk of cardiovascular disease; the relationship is established so that strategies to deal with it for drivers of Tehran provided for the entire country.

METHODOLOGY

This is an applied study in terms of objective; it is also a survey study. Data analysis method is correlational regression analysis. The main risk factors for cardiovascular disease include data variables, demographic and geographical characteristics. SPSS-22 was used for data processing. The descriptive data represented in Table 1. Then, we analyze data by T test and correlation coefficient; in order to test the first hypothesis, ANOVA was used. F value was used to test the hypotheses, and path analysis (estimating by partial least square method) was used to test other hypotheses. Thus, the Bartlett and KMO test was done to determine the adequacy of the

sampling. Based on the value which is obtained 0.1, the null hypothesis was rejected. In the next step in the modeling, refining and final variables were used to evaluate the model. Finally, the proposed model was applied.

Demographic characteristics of the respondents include cardiovascular disease, risk factors, and geographic features. The total number of data for 10 years covers during 2006-2015. Given that the PLS method was used to examine the relationship between variables, the normal distribution of the observations was not considered.

Table 1. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Age	310	33.40	51.86	40.2636	2.23692	.174	.138	1.547	.276
DriverExperience	310	.02	31.30	11.8211	3.69658	-.457	.138	2.969	.276
BMI	310	23.93	47.53	27.2055	2.78223	3.159	.138	17.441	.276
BPMax	310	93.11	133.32	117.1950	6.41924	-1.004	.138	1.157	.276
BPMin	310	7.27	104.73	80.4010	10.31330	-2.647	.138	17.105	.276
TG	310	120.72	362.77	169.4959	19.27278	3.544	.138	32.274	.276
Cholestrol	310	142.86	368.65	184.1723	13.71870	7.906	.138	106.050	.276
FBS	310	61.92	196.41	93.1949	8.14844	6.195	.138	83.667	.276
Depression	310	23.09	67.00	47.9060	6.65942	-1.082	.138	1.425	.276
CigarUseDuration_Current	310	.01	14.34	3.0416	2.69858	2.166	.138	6.053	.276
temp	310	9.00	27.60	16.8045	4.08252	.858	.138	.793	.276
humid	310	25.40	83.80	48.6600	14.72431	.729	.138	-.206	.276
pressure	310	795.90	1018.10	891.3510	63.86948	1.015	.138	-.166	.276
nodust	310	.00	20.60	3.5897	3.07718	1.560	.138	4.817	.276
wind.s	310	1.00	6.60	2.6258	.84093	1.241	.138	4.655	.276
heart.d	310	.40	25.90	8.2206	5.24323	1.187	.138	1.176	.276
Valid N (listwise)	310								

The first hypothesis test

H0: There is no correlation between health management model and cardiovascular diseases.

H1: There is a correlation between health management model and cardiovascular diseases.

To test this hypothesis, health management is used as an indicator. Then, F test was used to test the correlation. According to ANOVA, there is a significant difference in health management model in provinces. Only in the bmi variable there is no significant difference between provinces, It will be equally effective. Therefore, the null hypothesis is rejected because F value for cardiovascular disease equaled 2.356. (Table 2).

Table 2. ANOVA To determine the difference in health management in the provinces

Percentage of heart disease					
	sum of squares	Degrees of freedom	average of squares	F	Sig.
Between group	1.205	9	.134	2.356	.014
Intergroup	15.852	279	.057		
Total	17.057	288			

Table 3. Multivariate Tests					
	Value	F	Hypothesis df	Error df	Sig.
Pillai's trace	8.074	10.841	450.000	4185.000	.000
Wilks' lambda	.000	36.744	450.000	3621.610	.000
Hotelling's trace	1554.344	908.888	450.000	3947.000	.000
Roy's largest root	1462.197	13598.436[a]	30.000	279.000	.000
Each F tests the multivariate effect of CITY. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.					
a. The statistic is an upper bound on F that yields a lower bound on the significance level.					

Table 4. Univariate Tests

Dependent Variable		Sum of Squares	df	Mean Square	F	Sig.
Age	Contrast	485.461	30	16.182	4.256	.000
	Error	1060.722	279	3.802		
DriverExperience	Contrast	3192.210	30	106.407	28.818	.000
	Error	1030.179	279	3.692		
BMI	Contrast	558.783	30	18.626	1.172	.252
	Error	4433.523	279	15.891		
BPMax	Contrast	2412.780	30	80.426	2.174	.001
	Error	10320.091	279	36.990		
BPMin	Contrast	11118.506	30	370.617	4.755	.000
	Error	21748.044	279	77.950		
TG	Contrast	45597.445	30	1519.915	6.130	.000
	Error	69177.512	279	247.948		
Cholestrol	Contrast	8588.329	30	286.278	1.611	.026
	Error	49566.316	279	177.657		
FBS	Contrast	4613.949	30	153.798	2.698	.000
	Error	15902.739	279	56.999		
Depression	Contrast	7941.893	30	264.730	12.819	.000
	Error	5761.600	279	20.651		
CigarUseDuration_Current	Contrast	1915.910	30	63.864	53.293	.000
	Error	334.339	279	1.198		
temp	Contrast	5076.206	30	169.207	638.923	.000
	Error	73.888	279	.265		
humid	Contrast	65817.936	30	2193.931	520.974	.000
	Error	1174.928	279	4.211		
pressure	Contrast	1259504.743	30	41983.491	11686.842	.000
	Error	1002.272	279	3.592		
nodust	Contrast	2149.031	30	71.634	25.725	.000
	Error	776.896	279	2.785		
wind.s	Contrast	160.834	30	5.361	25.932	.000
	Error	57.680	279	.207		

The F tests the effect of CITY. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.

F value was used to test the hypotheses, and path analysis (estimating by partial least square method) was used to test other hypotheses. Thus, the Bartlett and KMO test was done to determine the adequacy of the sampling. Based on the the value which is obtained 0.1, the null hypothesis was rejected. In the next step in the modeling, refining and final variables were used to evaluate the model. Demographic characteristics of the respondents include cardiovascular disease, risk factors, and geographic features. The total number of data for 10 years covers during 2006-2015. Given that the PLS method was used to examine the relationship between variables, the normal distribution of the observations was not considered. The variables selected have been highlighted in yellow. The variables with the highest factor loading were selected.

The rest of study was conducted using partial least square method to estimate the structural equations. In this estimate, the results of the estimation coefficient, a statistic T, and goodness of fit tests are listed. The amount of at least 1.6 at 90% and 1.96 at 95% for the statistic T represents a meaningful relationship. In the following figures, the overall chart estimating structural equation shown separately (Figures 1 and 2).

The hidden variables include demographic factors (such as age and driving record), geographical features (including air temperature, relative humidity, air pressure, number of days without dust in the month and the average wind speed), risk factors include: the systolic pressure (diastolic pressure), (triglycerides), (cholesterol), (FBS), (depression), and (smoking / year) as independent variables and heart disease (percentage of heart patients in the sample) as the dependent variable. This latent variables and observed variables with the same components presented above for each variable are shown. T value is shown for each variable.

Table 5. Sufficient data test (KMO and Bartlett's Test)		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.516
Bartlett's Test of Sphericity	Approx. Chi-Square	1784.103
	df	105
	Sig.	.000

The final structural model for IRAN provinces:

Second hypothesis: the results have shown that the relationship between demographic variables and risk factors for cardiovascular disease is positive and significant. According to statistics, the value calculated for t= 6.568 which is more than 1.96, we can say that at least 95 percent of significance level, the relationship between the two variables is confirmed. The estimated coefficient equal to + 0.631. This result suggests that there is a significant positive relationship between demographic variables and risk factors. This means that the main risk factors among drivers' ages and driving experience are more observed.

The third hypothesis: the results have shown that the relationship between two variables, geographical features and the risk factors for more than 95% (t= 1.983) is significant. The impact of geographic factors on major risk factors for cardiovascular disease is significant. The estimated coefficient for variable geographical features obtained - 0.353 that shows the negative correlation between the two variables is undervalued. The main components of an effective geographical risk factors including air temperature and humidity rate. With the increase in air temperature and humidity, the risk factors for cardiovascular disease are reduced.

The fourth hypothesis: the results have shown that the relationship between the two variables and risk factors for heart disease in more than 95% (t= 4.842) is significant. The estimated coefficient for variable risk factor equaled +0.54 obtained. The relationship between risk factors and mediators and the latent variable is positive and significant. The main components with increased risk factors for cardiovascular diseases also increased. According to the coefficients obtained in the model, the most important factors affecting cardiovascular disease in drivers of Iran include the mass of abdominal fat (obesity), High triglycerides, depression, smoking, glucose and diastolic bloodpressure

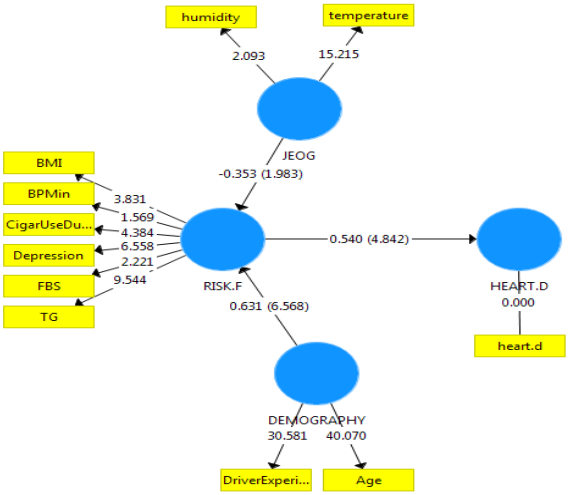

Figure 1. The results of the final estimate coefficients T statistics of structural equation model

The numbers shown on the arrow that connects the hidden variables, as well as brackets indicate the estimated coefficient value and T- value is reported. The results show that the relationship is significant.

In order to confirm the results of the model tests were used. Among them, the test average variance extracted (AVE) and the coefficient is a good fit. As well as other factors such as NFI and SRMSR is also used to evaluate the goodness of fit that the values of these two parameters respectively obtained 0.5 and 0.1. This result indicates a very low error estimate and it is a good fit (Table 5).

Test average variance extracted (AVE):

This indicator was proposed by Fornell and Larkr (1981) for this indicator is considered at least 0.5. This means that the hidden variable explain about 50% of the variance of observations. The results showed that the values obtained as follow: 70% for demographic factors, 60% for the geographic factors, and 30% for the main risk factors. (figure.2,Values shown in the blue circle).

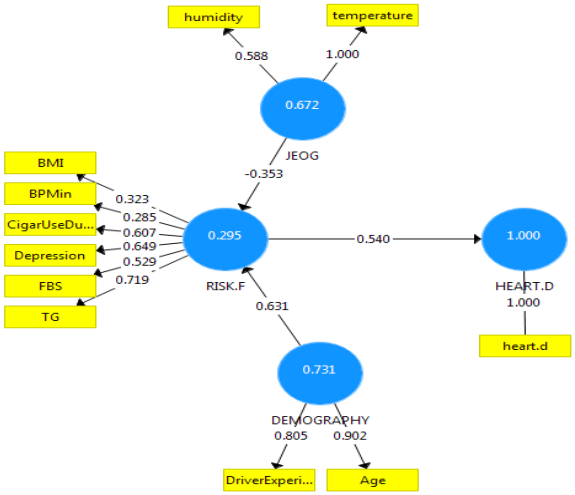

Figure 2. Management model of cardiovascular diseases among drivers in IRAN

Table 6 - values and goodness and fit test model

Index	SRMR	NFI	VIF	R2	AVE
Value	0.11	0.29	1.09	0.564	0.776
Standard	<0.1	>0.30	<5	>0.5	>0.5

SRMR: Standardized Root Mean Square Residual
VIF: Variance Inflation Factor
NFI: Normed Fit Index
AVE: Average Variance Extracted

Findings

The results have shown that the average age of drivers was 40.27 years old, the average of work experience was 11.82, and the average of BMI was 27.2 kg/m2, that showed an overweight. According to mean values of 80.4 for diastolic pressure, and 117.2 for systolic pressure, the drivers are at risk high blood pressure. The average value of TG (triglycerides) equaled 169.5. And the average value of CHOL equaled 184.2 that is over 150, so in this respect, the drivers are at the border risk. The average value of FBS equaled 93.2 close to the risk and the deppression equaled 47.9 and the average standard of health is 30-70. The average of smoking equaled 3.46. Also according to results of heart disease, on average, 8.22 percent of drivers suffer heart disease.

DISCUSSION AND CONCLUSION

The results indicate that in addition to the risk factors for cardiovascular disease, demographic factors and geographical factors also can be used as latent variables intervening on the risk factors for cardiovascular disease impact, as the results come in their impact coefficients the arrows are determined. Demographic factors and geographical factors had positive effect and significant. The risk factors and the influence received from demographic and geographic variables affect on cardiovascular disease.

As can be seen with increasing age and experience driving, the increased risk factors than shown and With increasing temperature and humidity, the risk of decreasing risk factors increases Therefore, in provinces with high temperature and high humidity, there is a greater chance of reducing the risk factors for cardiovascular disease. with the main variables, diastolic blood pressure and obesity, abdominal mass, cigar, depression and triglycerides found in this study, heart disease vascular drivers in Provinces of Iran in the total population have increased. Also, by reducing the air temperature and humidity, but most likely increase of the risk factor is low, it is considered a research proposal for future research.

According to the structural model developed in this study, firstly the variables to three groups and each with coefficients specified in the scientific management of diseases are important for the cardiovascular impact and probability of risk factors in different provinces due to differences in demographic characteristics and geographical conditions. It is noteworthy that the decision on the macro level in line with regional management is different. As we know, over time, changes are all human and individual circumstances and futures for a suitable and preventive safety measures should be designed in advance. The research in this area and volume for the first time in the country has been made. This phase or identify hazards and to implement the next phases of management is proposed to be allocated first priority to prevention of risk factors obtained. According to data access drivers' health by province, the studies carried out in all provinces. The health committee in the central building of the road toll and transit countries will be organized

for the whole country to manage cardiovascular disease and other diseases with the aim of reducing road accident statistics.

ACKNOWLEDGEMENT

I appreciate all officials of road transport organization that helped me in conducting this research. I would also appreciate respected Professors of Shakhes pajouh Research Institute and the professors in research center of Shahid Rajaei Hospital. I would also appreciate the professors of different Universities.

This research has been conducted by collaboration with the Office of Management and Budget Organization and Transport Organization.

REFERENCES

1. J. K. Murray, Lopez A, D, (1998). Tehran: Ministry of Health and Medical Education.
2. Naghavi, (2005). Tehran: Ministry of Health and Medical Education.
3. Asadi and Rostamzadeh, (2000). Kourdestan: Ministry of Health and Medical Education.
4. Hir Joseph, Thomas Holt, Ryngl Christian, Sarstd Marco, Adel Azar (2011).
5. Seyyed Mahdi et al., (2010).
6. Heart Bureau of the Ministry of Health, (2014).
7. Ministry of Health and Medical Education. (2014).

How to cite this article: Tajik M, Nouhi F, Malekpour M et al. Designing cardiovascular disease management model for drivers of Iran during 2006-2015. Galore International Journal of Health Sciences & Research. 2017; 2(1): 1-7.

******