ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Study Of Qrisk2 Score And Spirometric Indices In Subjects At Metabolic Risk.

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ABSTRACT

Cardiovascular events are the most fearful outcome of the metabolic syndrome. Q risk2 score is an algorhythm developed for future CVD risk estimation over the next 10 years. The treatment of all risk factors of metabolic syndrome includes life style modification and exercise is the most integral part of it. Exercise of moderate intensity for 30-min duration per day for min 5days per week with a target of 150 min per week is recommended. So, lung function assessment should be done in early phase to increase the compliance of the patients. Therefore, this study has been done to find the relation between lung function and Qrisk2 score. Subjects were recruited from general population on the basis of Inclusion criteria and Exclusion criteria. A detailed clinical, family and past history was taken. Anthropometric measurements (height, weight, BMI, waist circumference) along with BP, FBS, lipid profile was measured & computerized spirometry was done in all subjects enrolled for study. QRISK 2 score was calculated by online calculator. All subjects were screened for components of metabolic syndrome and divided into two groups depending upon presence or absence of components. All subjects were distributed into two groups, subjects with Qrisk2 score <10 % were kept in low-risk group and those with >10 % score was kept in high/moderate risk group. Then, spirometric indices in both groups were statistically analysed. FEV1/FVC (%) was slightly higher (102.94 ±6.94) in subjects with metabolic syndrome components in comparison to heathy adults (99.05±7.29). FVC (%) is statistically significantly lower in subjects with metabolic risk factors. FEV1 was also lower in persons with metabolic risk factors. Preserved FEV1/FVC and decreased FEV1 and FVC indicates restrictive pattern in spirometric indices. We observed almost similar value of FEV1/FVC in low and high-risk group. Mean FEV1 and FVC both were lower in high-risk group subjects when compared with values of low-risk group individuals and the difference in FEV1 and FVC in both groups was statistically significant. Thus, reduced lung function (restrictive pattern) will increase relative risk to CVD in future may be due to poor compliance to exercise. Information regarding prior status of lung function will help to modify exercise plan that may increase compliance of the subject. Q risk2 score assessment must be done in all individual to optimise the treatment. We observed high Qrisk2 score is associated with restrictive ventilatory pattern and lung function assessment in individuals with any components of metabolic syndrome will help the individual to increase the compliance to the regular exercise

Keywords: Q Risk2 score, metabolic risk factors, spirometry, FVC

https://doi.org/10.33887/rjpbcs/2022.13.5.12

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ISSN: 0975-8585

INTRODUCTION

As per NCEP ATP III criteria [1], Metabolic syndrome is characterized by the presence of any three of the following conditions- Blood pressure ≥ 130/85 mmHg or treated for hypertension, fasting plasma glucose ≥ 110 mg/dl, Central obesity, TG ≥ 150 mg/dl and HDL-C < 40 mg/dl in male, < 50 mg/dl in female. Central obesity criteria has been redefined for Indian population as waist circumference ≥ 90 cm in male & ≥ 80 cm in female [2]. Thus, all five factors mentioned above are the components of the metabolic syndrome. These factors can also be referred as the risk factors for the development of Metabolic syndrome.

Cardiovascular events are the most fearful outcome of the metabolic syndrome. Stroke or transient ischemic attacks, myocardial infarction, CHF, peripheral vascular diseases and sometimes sudden cardiac deaths are the main cardiovascular events that are responsible for morbidity and mortality [3]. This is why, the main aim of the treatment of metabolic syndrome and it's all components is to control the clinical conditions and reduce the incidence of future cardiovascular diseases.

Q risk2 [4] score is an algorhythm developed for future CVD risk estimation over the next 10 years in percentage by physicians working in the UK National Health Service. This scoring system also calculates the relative risk for future cardiovascular disease. The Qrisk2 score considers the ethnicity of the Indian population therefore, QRISK2 score must be valid enough for Indian population to consider it for research purposes. As per risk classification by John I, if Qrisk2 score is <10% it indicates mild risk, 10-20-% moderate risk, >20% high risk of CVD in next 10 years [5].

Therefore, estimation of future risk of CVD will certainly help to intensify the treatment of metabolic syndrome and its components. Treatment of all risk factors of metabolic syndrome includes life style modification. Exercise is the most important integral part life style modification. Lackland DT et al [6] recommends moderate to vigorous intensity physical activity approx. 30-min duration on multiple days with a target of 150 min of exercise per week. But most limiting factor for exercise is exercise induced breathlessness may be due to cardiac or respiratory cause. Lung function assessment can be done easily by computerized spirometry (a non-invasive method). Therefore, lung function assessment should be done in early phase to increase the compliance of the patients.

We have seen earlier that Qrisk2 score estimates the probable risk of CVD in next 10 years. High score indicates higher probability to have CVD in near future and in such cases importance of regular exercise increases. There had been very limited studies done to assess the lung function status in subjects with components of metabolic syndrome. Therefore, this study has been done to find the relation between lung function and probability to have CVD in future i.e., Qrisk2 score.

MATERIAL AND METHODS

This study was done after taking ethical clearance from institutional ethical committee.

Inclusion criteria

Apparently healthy adults of age between 21-45 years have been recruited after a written consent.

Exclusion criteria

Subjects with any known cardiovascular, respiratory, endocrine, metabolic, genetic, congenital disease, acute febrile illness and females with pregnancy, lactation and any gynaecological disease were excluded.

A detailed clinical, family and past history was taken in recruited subjects. anthropometric measurements (height weight, BMI, waist circumference) along with blood pressure, fasting blood sugar, lipid profile was measured and computerized spirometry was done in all subjects enrolled for the study. QRISK 2 score was calculated by online calculator (https://www.qrisk.org/2017/index.php).

ISSN: 0975-8585

All subjects were screened for components of metabolic syndrome and divided into two groups depending upon presence or absence of components. Qrisk2 score was calculated with the help of online calculator. All the recruited subjects were distributed into two groups depending upon their Qrisk2 score. Subjects with Qrisk2 score <10 % were kept in low-risk group and subjects with >10 % score were kept in high/moderate risk group. Then, spirometric indices in both groups were statistically analysed.

OBSERVATIONS

Table1 shows comparisons of various parameters between subjects with and without components of metabolic syndrome. BMI, SBP, DBP, FBS, TG was statistically significantly higher in subjects with components of metabolic syndrome whereas, HDL was lower. FEV1/FVC (%) was 99.05±7.29 in subjects without MS components whereas 102.94±6.94 in subjects with MS components. FEV1 was 2.95± 0.42 in in subjects without MS components & 2.36±0.66 in subjects with MS risk factors. FVC (%) was 73.91±3.82 & 59.42±9.83 in subjects without and with components of metabolic risk factors respectively.

Table 2 shows that all the subjects with no components of MS were having their Qrisk2 score <10%, indicating low risk of developing cardiovascular disease in next 10 years. In subjects with metabolic syndrome components, 63 were having their Qrisk2 score <10 (low risk for CVD) and 14 subjects were having their Qrisk2 score >10%.

Table 3 shows that age and weight were statistically significantly different in low risk (Qrisk2 <10) and high-risk group (Qrisk2 >10). Difference in gender and height was not statistically significant.

Table 4 shows that FEV1/FVC was 101.52±7.57 low-risk subjects and 101.71±4.65 in high-risk group. FVC was higher (2.68±0.57) in subjects of low-risk group (Qrisk2 score <10) than FVC of high-risk group (1.71±0.59). It also shows that the relative risk was 2.37±2.56 in low-risk group and 9.37±2.65 in high-risk group.

Table 1

	Metabolic Risk factors Absent (n=43)		Metabolic Risk factors Present (n=77)		p-Value
	Mean	±SD	Mean	±SD	
Age (years)	34.05	5.49	35.68	5.76	0.134
BMI	22.55	0.91	25.31	2.40	<0.001*
Systolic BP	118.05	7.55	134.78	13.33	<0.001*
Diastolic BP	78.23	4.96	86.13	13.50	<0.001*
FBS	89.44	5.91	104.13	23.35	<0.001*
TG	102.35	21.95	152.77	38.85	<0.001*
HDL	44.30	4.34	38.47	5.85	<0.001*
FEV1/FVC (%)	99.05	7.29	102.94	6.94	<0.001*
FEV1 (L)	2.95	0.42	2.36	0.66	<0.001*
FVC %	73.91	3.82	59.42	9.83	0.005*
Qrisk2	1.50	1.91	5.55	6.62	<0.001*
RR	1.61	2.85	4.07	3.40	<0.001*

Table 2

Q risk Score	Subjects without components of Metabolic syndrome (n=43)	Subjects with components of Metabolic syndrome (n=77)
<10% (Low risk)	43	63
>10% (Moderate/high risk)	00	14

ISSN: 0975-8585

Table 3

	Low Risk (Q risk 2 score ≤10)		High Risk (Q risk 2 score >10)		p-Value
	Mean	±SD	Mean	±SD	
Age (years)	34.38	5.57	40.5	3.32	<0.001*
Gender					
Male	86	81.13%	13	92.86%	0.477
Female	20	18.87%	1	7.14%	
Height (cm)	167.96	6.83	168.86	6	0.642
Weight (kg)	67.54	7.96	78.43	7.14	<0.001*

Table 4

	Low Risk (Q risk 2 score ≤10) [n=106]		High Risk (Q risk 2 score >10) [n=14]		p-Value
	Mean	±SD	Mean	±SD	
FEV1/FVC (%)	101.52	7.57	101.71	4.65	0.925
FEV1	3.20	0.65	2.11	0.73	<0.001*
FVC	2.68	0.57	1.71	0.59	<0.001*
RR	2.37	2.56	9.37	2.65	<0.001*

*=Significant (p<0.001)

DISCUSSION

In our study we found that subjects with components of metabolic syndrome have statistically significant higher BMI, BP, FBS, TG, and lower HDL. FEV1/FVC (%) is slightly higher (102.94 ±6.94) in subjects having metabolic syndrome components in comparison to heathy adults (99.05±7.29). FVC (%) is statistically significantly lower in subjects with metabolic risk factors. FEV1 was also lower in persons with metabolic risk factors. Preserved FEV1/FVC and decreased FEV1 and FVC indicates restrictive pattern in spirometric indices [7].

Chen WL et al [8] observed in their study that greater number of components of metabolic syndrome is strongly associated with poorer FVC and FEV1. It was also observed that subjects with metabolic syndrome components were having statistically significant higher Qrisk2 score and higher relative risk for future CVD that might be contributed by poor lung functions. Wang B et al [9] observed reduced lung function was associated with increased cardiovascular risk in Chinese population.

In the present study, it was observed that all subjects with no components of MS were having their Qrisk2 score <10%. This denotes that they have low risk for CVD in next 10 years. Among subjects having metabolic risk factors, 63 subjects had low risk (Qrisk2 score <10%) and 14 subjects had high risk (Qrisk2 score >10%) for CVD in next 10 years. Finnikin S et al [10] concluded in their article that in absence of Qrisk2 score, prescription of statin is mainly based on total cholesterol but use of Qrisk2 score system optimise the prescription. Thus, Qrisk2 score assessment will help to find out high risk individuals and help to optimise the treatment.

When we divided all the subjects into low risk (Q risk 2 score ≤10) and High Risk (Q risk 2 score >10) group, it was observed that age and weight were having statistically significant p value. Whereas p value for gender and height was not significant. Thus, age and weight are the variables that affect the Qrisk2 score most.

Similarly, we observed almost similar value of FEV1/FVC in low and high-risk group. Mean FEV1 and FVC both were lower in high-risk group subjects when compared with values of low-risk group individuals and the difference in FEV1 and FVC in both groups was statistically significant. We know that preserved FEV1/FVC and decreased FEV1 and FVC denoted restrictive pattern in spirometry. Nakajima K[11] observed restrictive spirometric pattern may be associated with metabolic syndrome. Thus, it is easily concluded from our data that high risk group subjects have more stronger restrictive pattern in comparisons to low-risk group. Scarlata S et al [12] concluded that restrictive ventilatory effort increases

mortality in elderly. Therefore, relatively more advanced restrictive pattern in individuals of high-risk group in comparison to low-risk group predisposes the former group to increase in mortality. In accordance to above description, we have observed increased relative risk of cardio-vascular disease in next 10 year in high-risk group than low-risk group that was statistically significant.

Thus, reduced lung function with restrictive spirometric pattern will increase relative risk to CVD in future may be due to poor compliance to exercise which is very important part of the treatment of metabolic syndrome and its components. Information regarding prior status of lung function will help to modify exercise plan that will increase the compliance of the subject to life style modification.

CONCLUSIONS

- Q risk score assessment must be done in all individual to optimise the treatment
- High Qrisk2 score is associated with more restrictive ventilatory pattern
- Lung function assessment in all individuals with any components of metabolic syndrome will help the individual to increase the compliance to the regular exercise

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