BYSSINOSIS IN GINNING FACTORIES OF RURAL SINDH

Pages with reference to book, From 239 To 241

Salimuddin Aziz, Tariq Zia Lodi, S. Ejaz Alam (PMRC Research Centre, Jinnah Postgraduate Medical Centre, Karachi.)

ABSTRACT

Frequency of byssinosis in 276 workers from 5 ginning factories of rural Sindh are described. Twenty-four (9%) had byssinosis, 178 were asymptomatic and the remaining 74 had other respiratory symptoms. Chronic obstructive pulmonary disease was present both in symptomatic and asymptomatic workers and was equally distributed amongst smokers and non-smokers. A possible involvement of some factors other than cigarette smoking is discussed (JPMA 42: 239, 1992).

INTRODUCTION

Bernardo Ramazzini[1], in De Morbis Artificim described incessant cough and asthma like symptoms in carders and weavers of flax and hemp. Kay described these symptoms in cotton mill workers in "spinner phthisis" in 1831[2]. The term \'byssinosis\' was first used by Oliver[3] in 1902, having been coined by Proust[4] in 1877. The first survey was conducted in 1950[5]. Byssinosis is diagnosed by symptoms of chest tightness, difficulty in breathing or both on the first day of work, after a period of rest[6]. Pulmonary functions usually show acute changes in post-work measurements. This study was designed to assess prevalence of byssinosis in ginning factories of Sindh in Tharparker district, home to many factories, with a combination of both new and old machines.

SUBJECTS AND METHODS

Five mills, both new and old, were selected and total work force was included in the study. Each worker was interviewed according to a specially designed proforma on the pattern of the one designed byBritish Medical Research Council. Each worker had a physical examination and pulmonary function test (PFT) using a cornputensed S-model vitalograph before and after completing 8 hours work shift in standing position without the nasal clip. The procedure was explained and trial runs conducted before recording three efforts. The computer automatically selected the best effort. Values for forced vital capacity (PVC), forced expiratory volume in one second (FEY1), forced expiratory volume percent (FEV1%) and forced expiratory flow rates .2-1.2 ml (PEP .2-1.2L) and (FEF 25-75%) were obtained. Each worker was x-rayed and sputum examined for AFB by direct smear. Diagnosis of byssinosis was made when recurrent pattern of chest tightness or difficulty in breathing and cough on Saturdays after a day of rest was observed. Symptoms were graded according to Schillings as follows[9]:

Grade 0 No symptoms
Grade 1/2 Occasional chest tightness or difficulty in breathing on Saturdays.
Grade 1 Chest tightness or difficulty in breathing on every Saturday.
Grade 2 Chest tightness or difficulty in breathing on Saturdays and other days.
Grade 3 Grade 2 symptoms with permanent incapacity.

Respiratory functions were graded as follows:

F-0 No acute effect or chronic ventilatory impairment.
F-i/2 Slight acute effect (FEy1 decrease 0.06.0.2L).
F-i Definite acute effect (FEV1 decrease> 0.6 lit)
F-2 Slight or moderate irreversible ventilatory impairment (FEV1% 60-80% of predicted)

F-3 Moderate to severe ventilatory impairment (FEV1% <60% of predicted) Workers were divided into three groups according to their symptoms. Byssinotics, symptomatic other than byssinosis and asymptomatics. Statistical analysis was done using chi square and student's 't' test.

RESULTS

Three hundred and ten workers were examined, 18 had acute or healed pulmonary tuberculosis, 10 chronic bronchitis or asthma and 6 missed pre or post work shift PFT and hence were excluded. Twenty-four (9%) of 276 workers had byssinosis; of the remaining 252, 74 had respiratory symptoms not typical of byssinosis (Table I)

TABLE I. Symptoms.

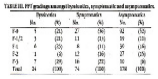
No. of patients	Symptoms
	Byssinosis
22	Chest tightness and difficulty in breathing on Saturdays (Grade 1)
2	Chest tightness and difficulty in breathing on Saturdays and other days as well
6	Mild cough
8	Moderate cough
	Other symptomatic
58	Mild cough
16	Moderate cough

and the rest were asymptomatic. Amongst byssinotics, 15 (63%) were smokers a percentage higher than both 37 (50%) non-byssinotic symptomatic and 65 (37%) asymptomatic. Average exposure to cotton dust amongst byssinotics was not much different to other groups and ranged between 12-16 years. Post shift PFT in byssinotics had lower values but were not remarkably significant (Table II).

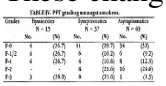
TABLE II. Pre and post shift PFT in cotton gins.

	Byssinosis (24) x ±S.D.			Symptomatic (74) x ±S.D.			Asymptomatic (178) x ±S.D.		
	Pre	Post	P-value	Pre	Post	P-value	Pre	Post	P-value
V.C.	81±21	74±18	N.S.	79±18	76±17	N.S.	80±15	80±16	N.S.
F.V.C.	85±25	73±20	N.S.	81±20	76±18	N.S.	83±16	80±13	N.S.
FEV1	73±29	68±23	N.S.	70±23	64±21	N.S.	77±16	73±15	<0.01
FEV1%	86±24	81±20	N.S.	89±17	86±16	N.S.	92±13	91±14	<0.05
FEF.2-1.2	63±33	53±35	N.S.	59±29	51±29	N.S.	70±38	63±26	<0.05
FEF (25-75)	61±37	57±50	N.S.	63±48	55±42	N.S.	65±57	58±34	N.S.

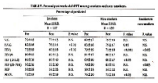
F-3 changes were higher (29%) amongst byssinotics compared to both non-byssinotic symptomatics (22%) and asymptomatics (6%) (Table III).



These changes were equally distributed among smokers and non-smokers (Table IV).



However when PET were compared amongst smokers and non-smokers there was significant difference in FEV1, FEV1% and flow rates (Table V)



similar changes were observed when pre and post PFT was compared in total 276 workers (Table VI).

TABLE VI. Pre and post PFT in total workers in gins.

	Mean ± S. D. N = 376		
	Pre	Post	P. value
VC	79±14	78±14	N.S.
FVC	83±17	79±16	<0.01
FEV1	74±19	70±18	<0.01
FEV1%	89±18	86±17	<0.05
FEF (2-1.2)	66±36	59±28	<0.01
FEF (25-75%)	64±36	57±37	N.S.

DISCUSSION

Byssinosis defined as recurrent chest tightness or difficulty in breathing, or both, on the first day of work after a period of rest. It was first recognised amongst flax7 and cotton[8] mattress workers and later in the cotton mills[9]. Kay[2] describing the symptoms, wrote 'patient experience a diffuse and obscure sensation behind the sternum", and later a recurrent pattern of symptoms on the first working day after rest[6]. The disease has worldwide distribution in countries involved in growing and using cotton fibre. The prevalence differs in different countries, but the pattern is similar. In the present study 9% workers complained of byssinotic symptoms. Twenty-one percent had normal PET and another 21% only showed F-1/2 changes. Although post work shift recordings showed slight decrease in PET values, these were statistically not significant This does raise the question should these workers be classified as potential byssinotics or are these symptoms spurious and the diagnosis must rest on more significant objective changes in PFT. In our experience it is seldom that a worker describes his symptom as chest tightness, though history of difficulty in breathing especially on Saturdays with or without cough is usually available. This lack of correlation of symptoms with PFT makes diagnosis very difficult. F-3 changes amongst non-byssinotic symptomatics were higher than in asymptomatics (Table III) but equally distributed among smokers and non-smokers (Table IV). Some had decrease in post work shift PET while others had no acute effect. In the absence of byssinotic symptoms these would be classified as chronic obstructive pulmonary disease (COPD), hence all groups includ ing byssinotics must include some cases of COPD also. Asymptomatics and those not complaining of truly byssinostic symptoms also had fair numbers with severely compromised PFT, although these changes were higher amongst symptomatics. This raises a further question "whether exposure to cotton dust increases the risk of COPD"? A widely accepted predictor of eventual development of COPD is an accelerated decline of expiratory flow rates, especially FEY1 and requires repeated PFT over a number of years. Studies conducted so far[10-13] have shown greater declines of FEY1 in cotton workers compared to workers handling synthetic fibre. It has also been suggested that cotton workers have higher prevalence of disabling lung functions than people in a community at large not exposed to cotton dust[14] and other agriculture workers[15]. It is generally accepted that an exposure of 10-20 years in cotton mills is usually required for COPD[16]. Since work in our gins is seasonal, an exposure of 40-80 years will be required to produce similar exposure of cotton dust, hence the level of chronic disease should be much lower than that seen in cotton mills. With an average exposure of 15 years in this study the prevalence of chronic disease is higher in symptomatics than asymptomatics and equally distributed amongst smokers and non- smokers. This suggests that there may possibly be some other factor or factors involved in this incidence for example, the quality of cotton handled or contamination[17]. Very few studies have been conducted in ginning factories. In Egypt preliminary reports suggested 52% prevalence[18] which with better dust controls in late sixties was estimated to be 11 ,3%[19], whereas in the United States, Palmer[20] did not find any, the reason put forward was that since in the States gin's working is a continuous process without rest period, workers didnotdevelop any symptoms. Ours is the first study in Pakistani gins, the previous two studies[21,22] were conducted in cotton textile mills and showed a prevalence of 8-21%. As both these studies were based on symptoms and PFT done only during the work shift, these may have included some cases of COPD and missed those with acute changes only, but even then 8% seems a rather low and a figure of 21% seems more likely[22]. It is proposed that larger scale studies both in Sindh and Punjab should be conducted to assess the situation further and appropriate steps adopted

for its control. It is quite obvious that workers do not die of byssinosis but the pool of workers with irreversible ventilatory impairment will keep on increasing.

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