RESULTS

This study was done on one hundred and thirty subjects, classified into:

Group I:

One hundred proved pulmonary tuberculosis (TB-cases) admitted to Abbassia-Chest Hospital. Their ages ranges between 19-50 years. Each patient in this group subjected to:

1. History taking.
2. Clinical examination.
3. Radiological examination.
4. Tuberculin test (skin testing)
5. Bacteriological study including:
    a) Ziehl-Neelsen stained smears.
    b) Culture on Lowenstein-Jesnsen medium.
    c) Identification of isolates.
    d) Antimicrobial susceptibility test by proportion method.
6. Biochemical study including these indices:
    a) Serum urate level (serum uric acid).
    b) Serum creatinine.

Group II:

Thirty healthy subject were taken as control group, their ages ranges between 18-50 years. They were subjected to:

1. History taking.
2. Clinical examination.
3. Radiological examination.
4. Tuberculin test (skin testing)

5. Bacteriological study including:

   Ziehl-Neelsen stained smears.

6. Biochemical study including these indices:

   a. Serum urate level (serum uric acid).

   b. Serum creatinine.

The results of investigations done in the present study are given in Tables and Figures as following.

Group I:

One hundred proved pulmonary tuberculosis (TB-Cases) their age ranged from 19-50 years the sex distribution in the patients were (73) males and (27) females, as shown in Table (1a), Fig. (1).

Table (1a): Age and sex distribution in patients.

Age in years	Total number examined	Sex	
		Male	Female
* less than 30	23	20	3
* 30 – < 40	46	31	15
* 40 – < 50	23	16	7
* 50 – over	8	6	2
Total	100	73%	27%

Group II:

Thirty healthy control subjects. Their age ranged from 18 to 50 years, they have (23) males and (7) females, as shown in Table (1b), Fig. (2).

Table (1b): Age by years and sex distribution in control group.

Age in years	Total number examined	Sex	
		Male	Female
* less than 30	10	8	2
* 30 – < 40	11	8	3
* 40 – < 50	6	5	1
* 50 – over	3	2	1
Total	30	23	7
		(76.0%)	(23.3%)

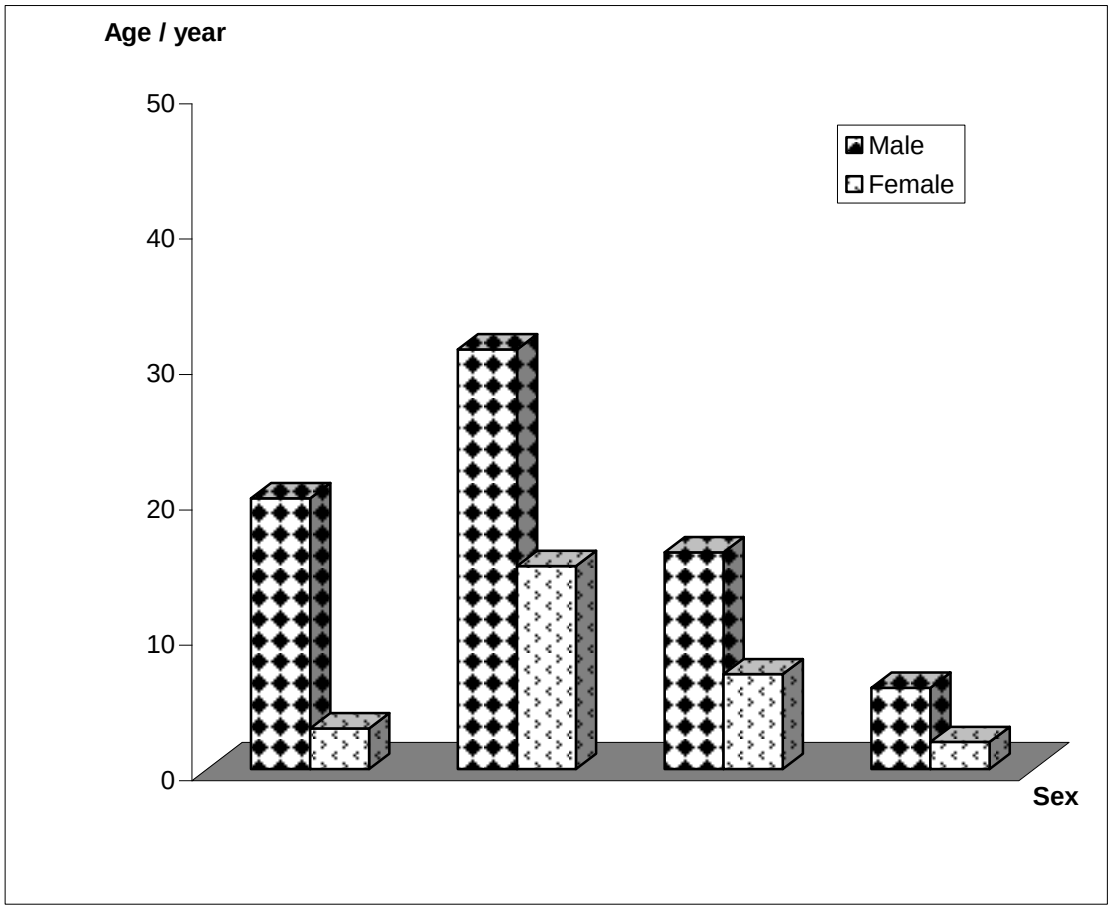

Fig. (1): Age and sex distribution in patients cases (Group I)

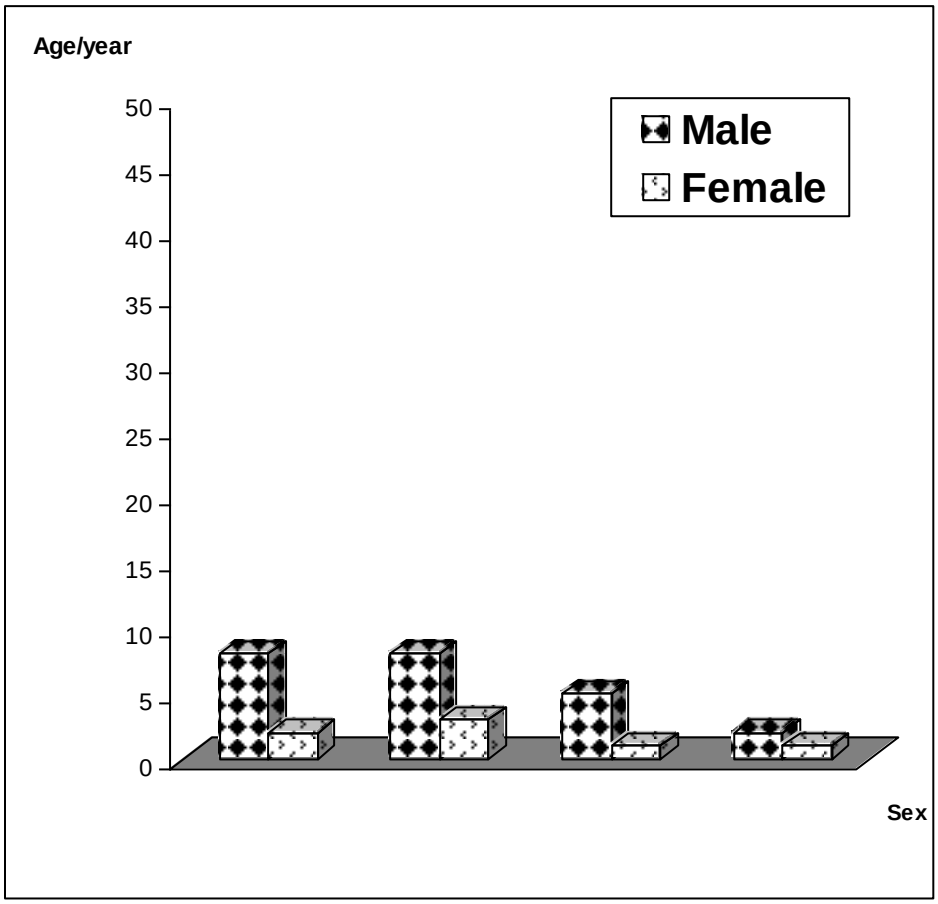

Fig (2): Age and sex distribution in control group (Group II).

Table (2), Figs. (3 , 4) as in group (I) show that, eight males (57.1%) and six female (19.2 %) were negative. It shows that 65 males (79.8%) and 21 female (28.0%) were positive cases. Also, the table shows the degree of the positivity of positive tuberculosis cases as follows: with P-value < 0.05.

- (Plus +ve) → (71.9%) males and (28.1%) females out of 57 patients.
- (Plus ++ve) → (80.8%) males and (19.2%) female out of 26 patients.
- (Plus +++ve) → (100%) males and (0.0%) females out of 3 patients.

Also, Fig. (4) shows Bacilli of mycobacterium in sputum stained by Ziehl-Nelsen Method, it appears with a red color with blue background of the slide.

Table (2): Showed the degree positivity for positive cases (Group I) %.

Degree of positivity	Sex		Mean	SD	Total
	Males	Females			
- Ve	8 (57.1%)	6 (42.9%)	3.725	0.293	14 (100%)
+ Ve	41 (71.9%)	16 (28.1%)	4.402	0.221	57 (100%)
++ Ve	21 (80.8)	5 (19.2%)	3.537	0.112	26 (100%)
(+++ Ve)	3 (100.0%)	0 (0.0%)	1.335	0.060	3 (100%)
Total	73 (100%)	27 (100%)	-	-	100.0 100.0%

P-value < 0.05 (statistically significant).

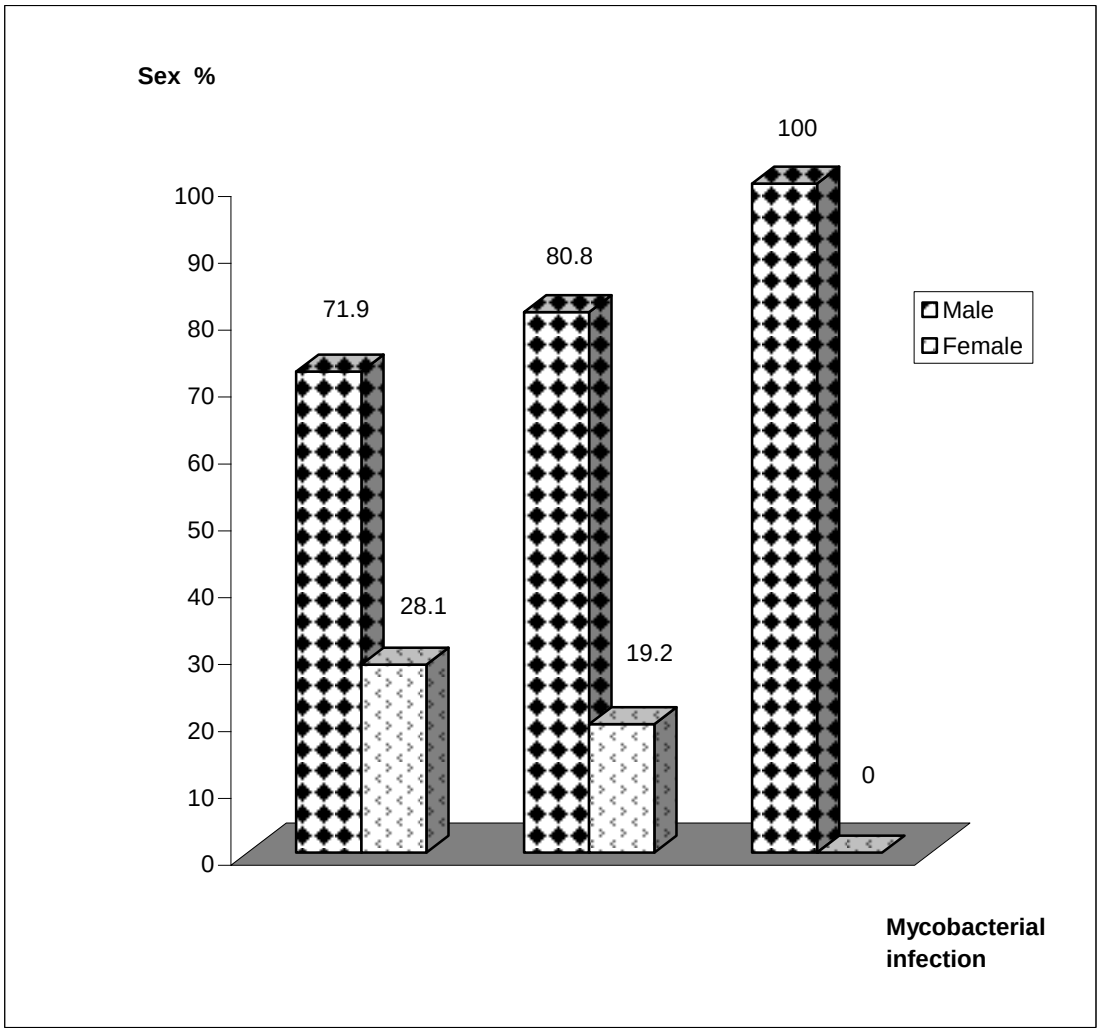

Fig (3): The distribution of mycobacterial positivity according to sex in TB Cases.

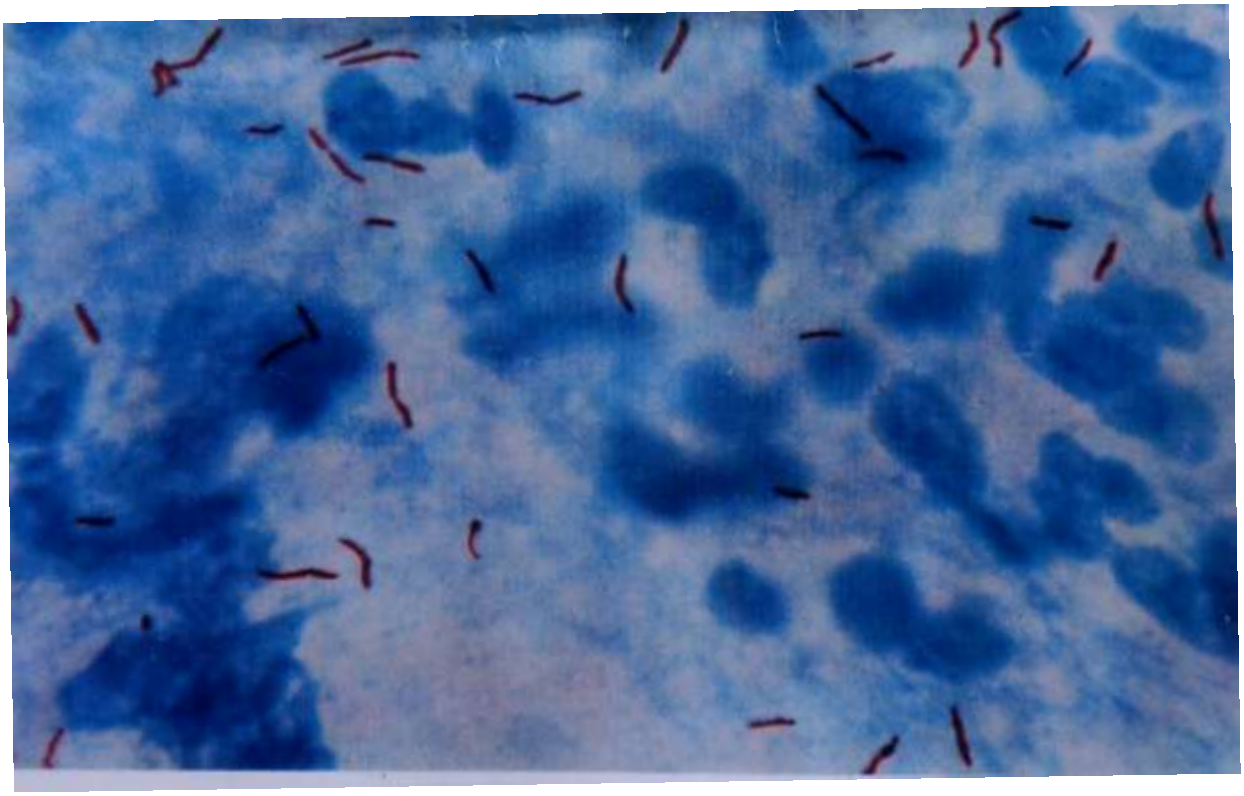

Fig. (4): Bacilli of mycobacterium in sputum stained by Ziehl-Neelsen method.

Table (3), Fig. (5) show the distribution of mycobacerial positivity according to age among group (I). The table revealed that, the patient were negative their ages ranges as follow 17.4% less than 30 year, 21.4%, 30 < 40 years and 7.1% their ages ranges between 40 < 50 years. The table shows that the most ages that the incidence of mycobacterial infection were observed in high percentage is 30 < 40 years (49%).

Table (3): The distribution of mycobacterial positivity according to age in TB Cases.

Cases	**Age of group**				**Mean**	**SD**	**Total**
	< 30 y	**30 < 40y**	**40 < 50 y**	**> 50 y**			
- Ve	10 (71.4%)	3 (21.4 %)	1 (7.1 %)	0 (0.0 %)	2.8234	0.221	14 (100%)
+ Ve	11 (19.3%)	32 (56.1%)	10 (17.5%)	4 (0.07)	14.2521	0.8122	57 (100%)
(++Ve)	8.0 (3.4%)	11 (42.3%)	10 (38.5%)	4 (15.41)	8.25214	0.6124	26 (100%)
(+++Ve)	1.0 (33.3%)	0 (0.0%)	2 (66.7%)	0.0 (0.0%)	0.75	0.004	3 (100%)
Total	23 (23%)	46 (46%)	23 (23%)	8 (8.0%)	-	-	100 (100%)

P-value < 0.05 (statistically significant)

Fig. (5) Wide Table

Table (4), Fig. (6) showed that, 76 cultures were positive and 24 cultures were negative out of 100 cultures performed.

Also, Fig. (7) showed that, mycobacterium colonies on Lowenstein Jensen Medium, it appears dry Friable, Irregular margin eugenic growth with cauliflower center and buff colour.

Table (4): The frequency percentage of cultures results on Lowenstein-Jensen medium.

Total number culture	**Positive**		**Negative**	
	No	%	No	%
100	76	76	24	24

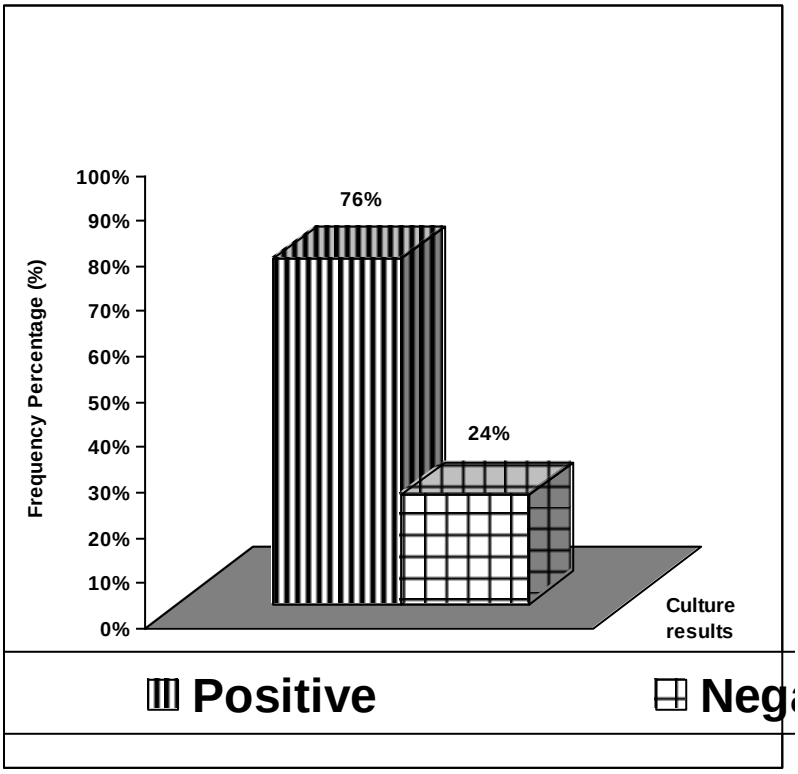

Fig. (6): The frequency percentage of cultures results on Lowenstein-Jensen medium.

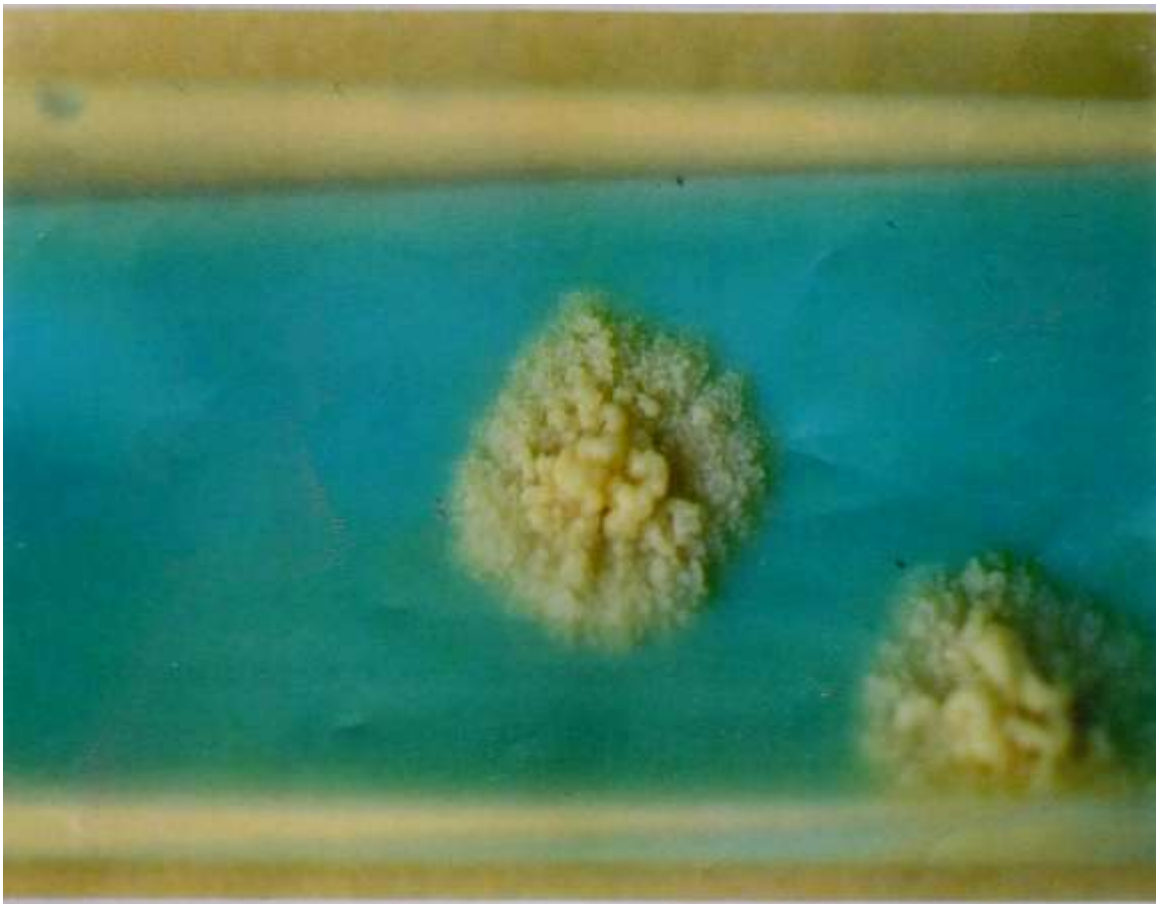

Fig. (7): Mycobacterium colonies on Lowenstein Jensen Medium (Dry Friable, Irregular margin eugenic growth with cauliflower center and buff colour.

Table (5) showed that by comparing the acid fast bacilli smears results and the mycobacterial cultures results, it was found that the sensitivity of AFB smears were 97% and specificity was 50%, the positive predictive value 86% and the negative predictive value 85.7 %.

Table (5): The sensitivity and specificity of smear for Acid-fast bacilli according to cultures on Lowenstein-Jensen medium.

Result of cultures	ZN score		Total
	Positive	Negative	
Positive	74	2	76
Negative	12	12	24
Total	86	14	100

Sensitivity (True-positive)	97.4%
Specificity (True negative)	50 %
Positive predictive value	86 %
Negative predictive Value	85 %

Identification of isolated bacteria:

Table (6), Figs. (8-12) showed the results which obtained with the biochemical identification tests performed with the positive culture isolates of m(76), the table revealed that, seventy six isolate were identified using the following tests: growth rate, pigment production, niacin test, nitrate reduction test, and also give, 72 (94.6%) were typical *M. tuberculosis* and 4 (5.8) were a typical *M. tuberculosis*.

Table (6): Biochemical tests of the positive cultures Isolates (76)**.**

Type of the isolates	Number %	Growth Slow rapid	Pigment Production N P S	Niacin + -	Nitrate + -
M. Tuberculosis	72 (94.6%)	72 – (94.6%)	72 - -	72 – (94.6%)	72 – (94.6%)
Atypical	4 (5.0%)	4 – (5.0%)	– 4 – (5.0%)	– 4 (5.0%)	– 4 (5.0%)

N → Non photochromogen.
P → Photochromogen.
S → Scotochromogen.

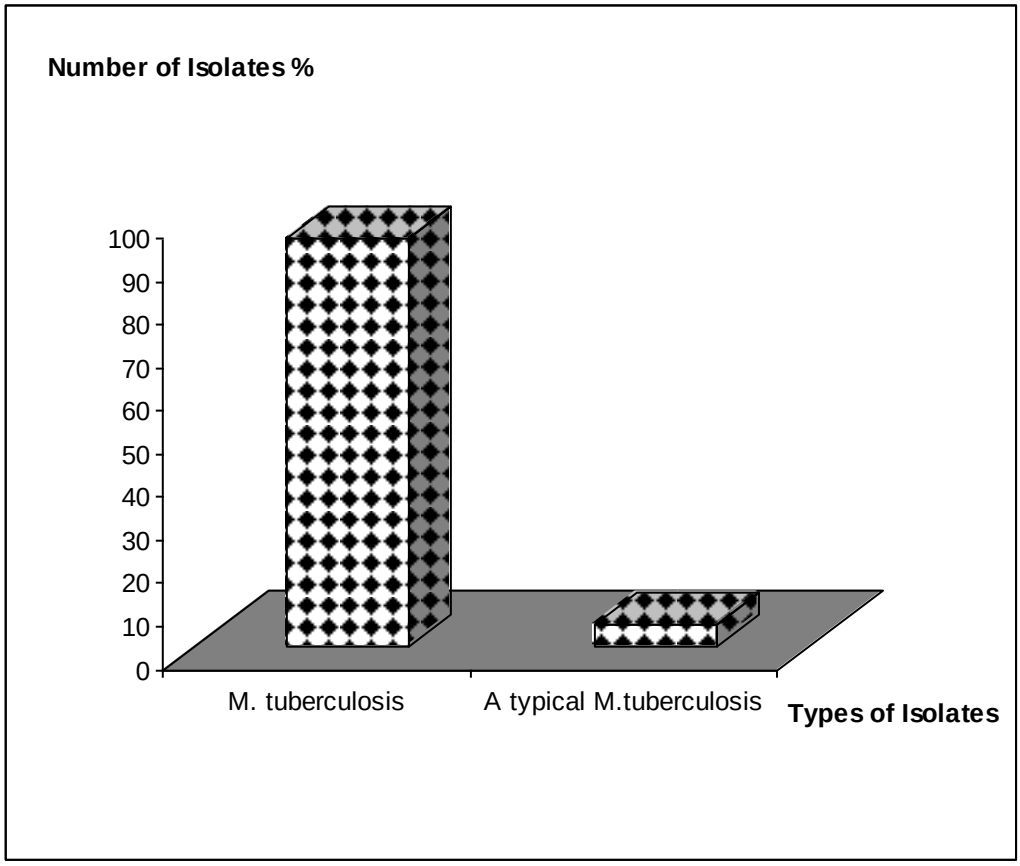

Fig. (8): Biochemical tests of the positive cultures Isolates (76).

Fig. (9): Types of strains isolated from Lowenstein Jensen medium.
Tube (0): *M. tuberculosis* colonies.
Tube (1): A typical *M. tuberculosis* colonies (photochromogen).
Tube (2): A typical *M. tuberculosis* colonies (photochromogen).
Tube (3): A typical *M. tuberculosis* colonies (photochromogen).
Tube (4): A typical *M. tuberculosis* colonies (photochromogen).

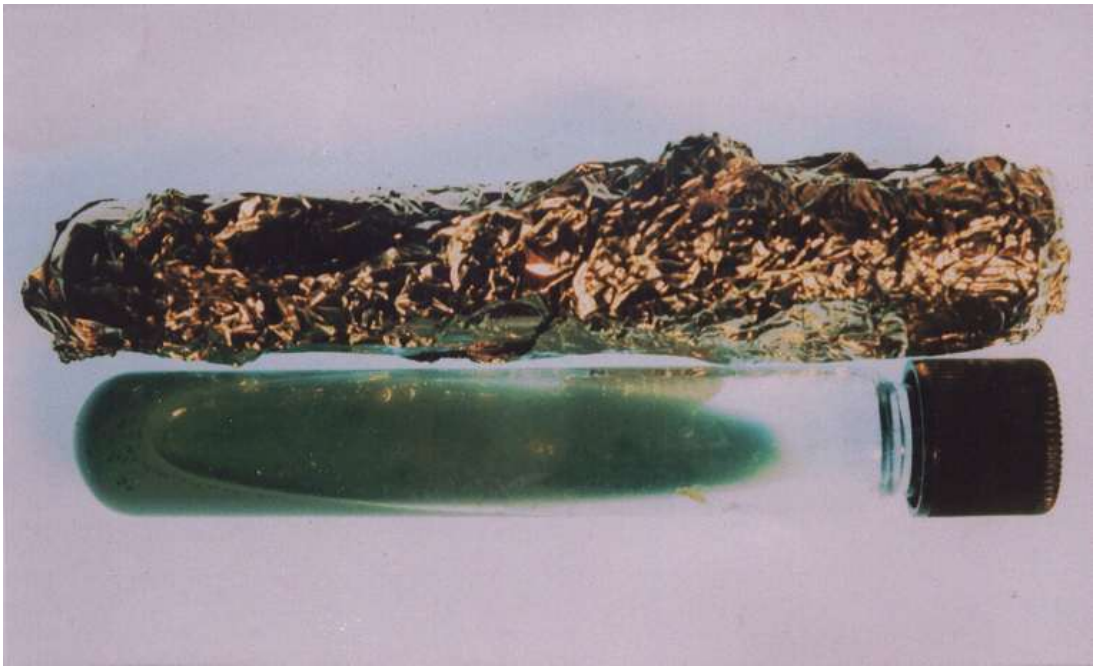

Fig. (10): Test of pigment production: the upper tube is folded by aluminum foil, and the lower one is unfolded.

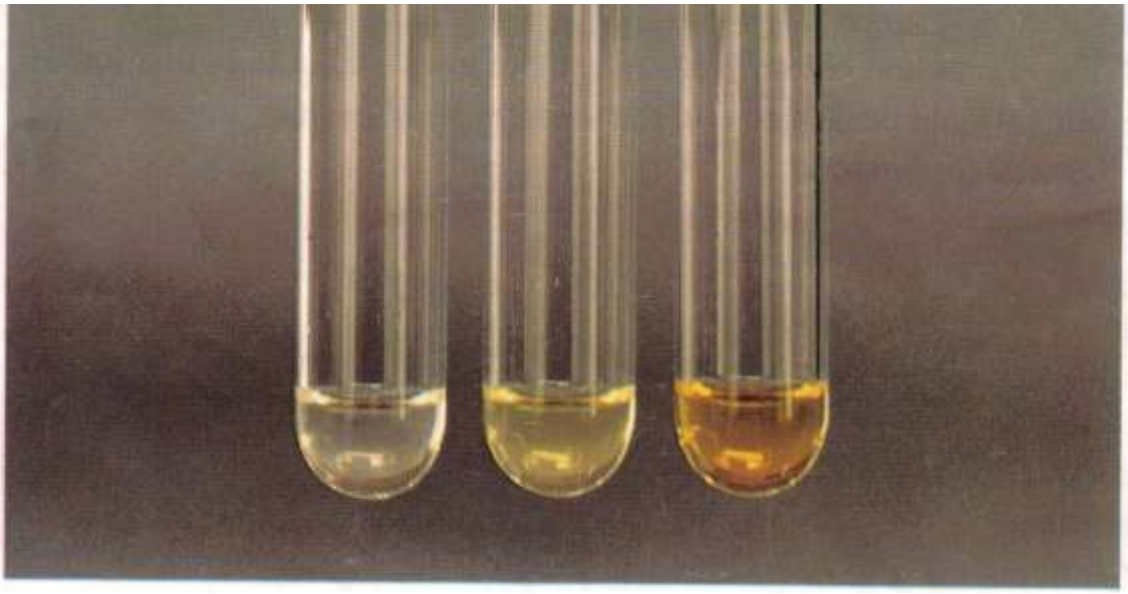

Fig. (11): Niacin test tube (1) negative control (colorless fluid), tube (2) positive (yellow fluid), tube (3) +++ve (dark yellow fluid).

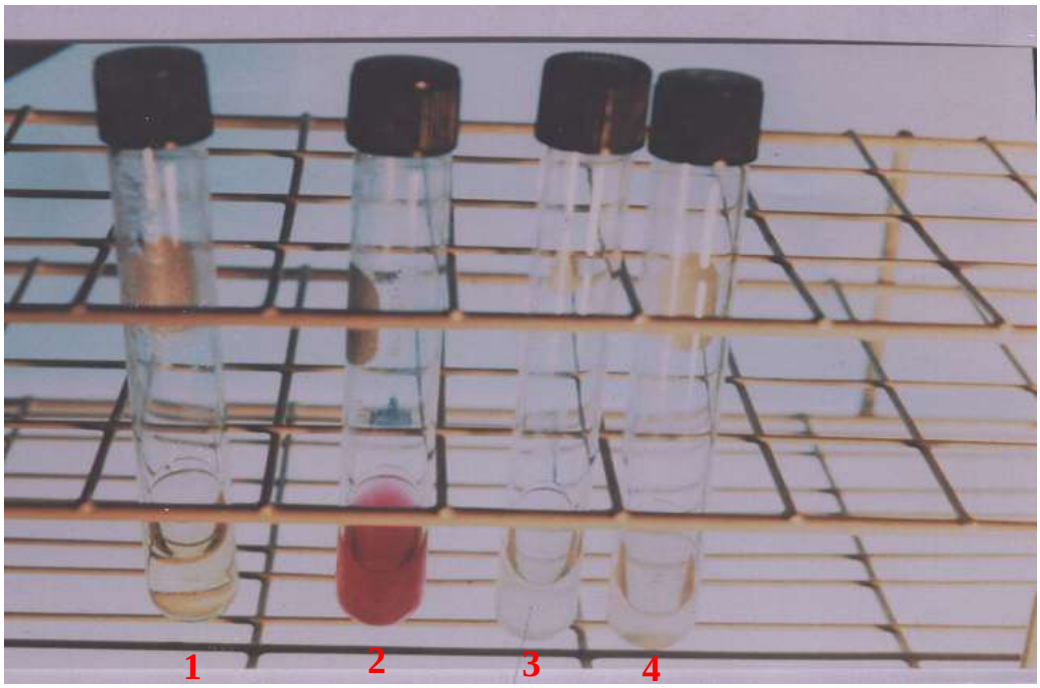

Fig. (12): Nitrate reduction test, tube (1) uninoculated (yellow), tube (2) positive control rate, tube (3) negative control yellow, tube (4) negative test yellow.

Antimicrobial susceptibility tests:

Table (7), Fig. (13) showed, that the strain were sensitive to streptomycin 68 (89.4%) and 8 (10.5%) were resistant. 58 (76.3%) were sensitive to isoniazid and also, 18 (23.6%) were resistant. 50 (65.7%) were sensitive to rifampin. Also, 26 (34.2%) were resistant. 70 (92%) were sensitive to ethambutol and 6 (7.8%) were resistant.

Table. (7): Antimicrobial susceptibility tests.

Types of strains	No. of Species	Streptomycin		Isoniazid		Rifampin		Ethambutol	
		S	R	S	R	S	R	S	R
M. Tuberculosis	72	64 (88.8%)	8 (11.1%)	54 (75%)	18 (25%)	46 (63.8%)	26 (36%)	66 (91.6%)	6 (.8.3%)
Atypical	1	1 (1.3%)	-	1 (1.3%)	-	1 (1.3%)	-	1 (1.3%)	-
Atypical	1	1 (1.3%)	-	1 (1.3%)	-	1 (1.3%)	-	1 (1.3%)	-
Atypical	1	1 (1.3%)	-	1 (1.3%)	-	1 (1.3%)	-	1 (1.3%)	-
Atypical	1	1 (1.3%)	-	1 (1.3%)	-	1 (1.3%)	-	1 (1.3%)	-
Total	76 (100%)	68 89.4%	8 10.5%	58 76.3%	18 23.6%	50 65.7%	26 34.2%	70 92%	6 7.8%

S: sensitive R: Resistant

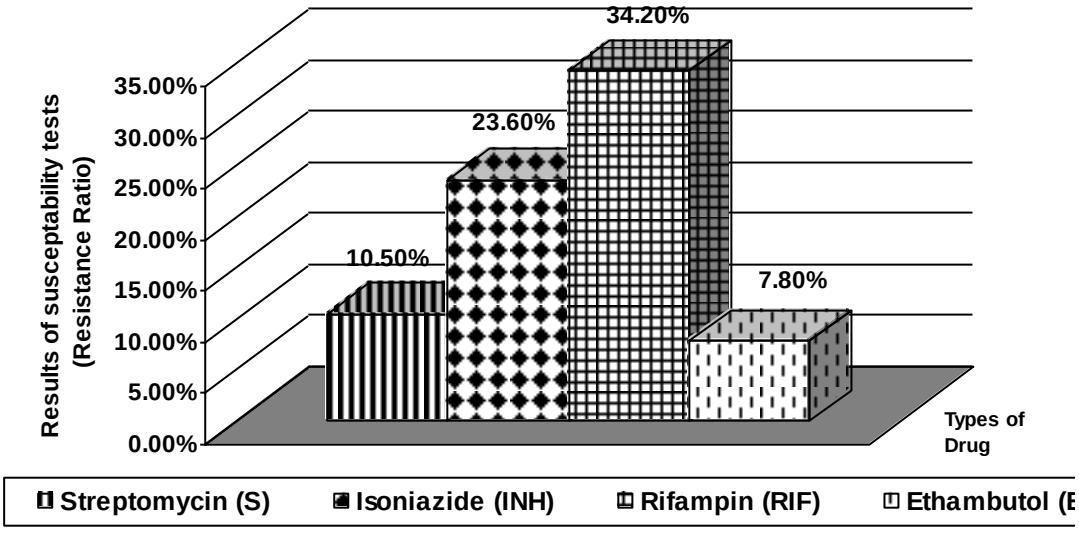

Fig. (13): Antimicrobial susceptibility tests (resistance ratio).

Table (8), Fig (14) revealed that, the positive tuberculin percent in patients 86% and 11 (36%) in control group out of 100 patient and 30 control subject respectively. Where the negative tuberculin percent in patients 14% and 19 (63.3%) in control group out of 100 patient and 30 control subject respectively with P-value < 0.05 (statically significant).

Table (8): Comparison between patients and control Group in tuberculin test :

Tuberculin test	**Cases**		**Mean**		**SD**		**Total**
	Patient	Control	Case	Control	Case	Control	
+ Ve	86 (86%)	11 (36.6%)	8.86	3.66	0.092	0.6991	97 97%
- Ve	14 14%	19 63.3%	4.41	6.60	0.088	0.0687	33 33
Total	100 100%	30 100%	-	-	-	-	130

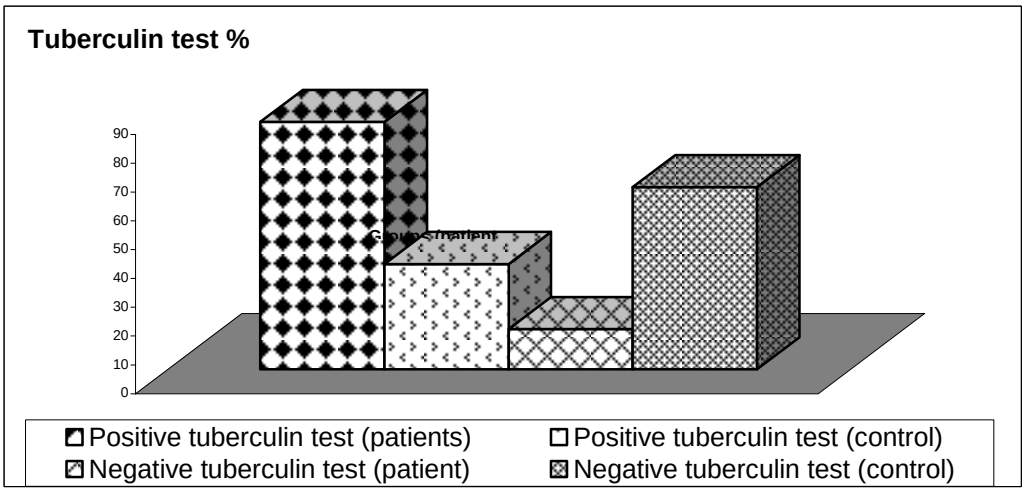

Fig (14): Comparison between patients and control group in tuberculin test.

Biochemical studies indices:

Table (9) shows mean uric acid level in pulmonary patients and creatinine level after 2 month and 4month respectively .

Table (9): Biochemical study indices.

		Mean	**N**	**SD**	**Mean**
Pair (1)	Uric acid 2M	5.2124	100	1.1285345	0.1128534
	Uric acid 4M	6.6001	100	1.6491641	0.1649164
Pair (2)	Creatinine 2M	0.613	100	0.141886	0.0141888
	Creatinine 4M	0.661	100	0.1788994	0.0178899

where (N) number pf patients.

Table (10), Figs. (15 & 16) showed the analysis results between serum uric and creatinine level after 2 months, 4months of treatment respectively in chronic , and recent patients.

Table (10) shows that 67 patient are fresh (recent) the mean uric acid after 2months equals (4.44mg/dl) and becomes (5.808 mg/dl) after 4months , but creatinine is stable no change either after 2 M or 4M.

In Table (10) also, there are 33 chronic patients, the mean uric acid after 2Months (5.74mg/dl) and becomes (8.206mg / dl) and no change in creatinine level either in 2 months or 4 months.

Table (10): Statistical analysis of serum uric acid and creatinine level results after 2 months, 4months of treatment respectively in chronic, and recent patients.

	Chronicity	**N**	**Mean**	**S D**
Uric acid 4M	fresh	67	5.808955224	1.0346616
	Chronic	33	8.206363636	1.4950205
Creatinine 4M	Fresh	67	0.766865672	0.157004
	Chronic	33	0.812121212	0.1832989
Uric acid 2M	Fresh	67	4.947761194	1.0913375
	Chronic	33	5.74969697	1.0194867
Creatinine 2M	Fresh	67	0.562686567	0.0982203
	Chronic	33	0.615151515	0.1622521

P-value < 0.05.
N = number of patients.

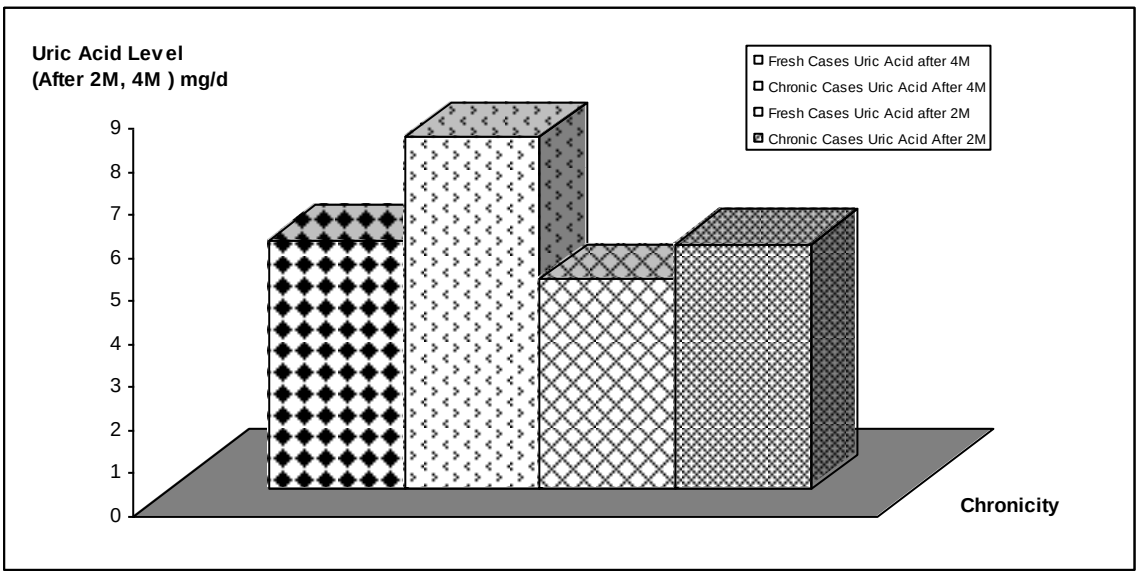

Fig (15): Statistical analysis of serum uric acid results after 4M.2M Months in chronic and recent (Fresh) Patients.

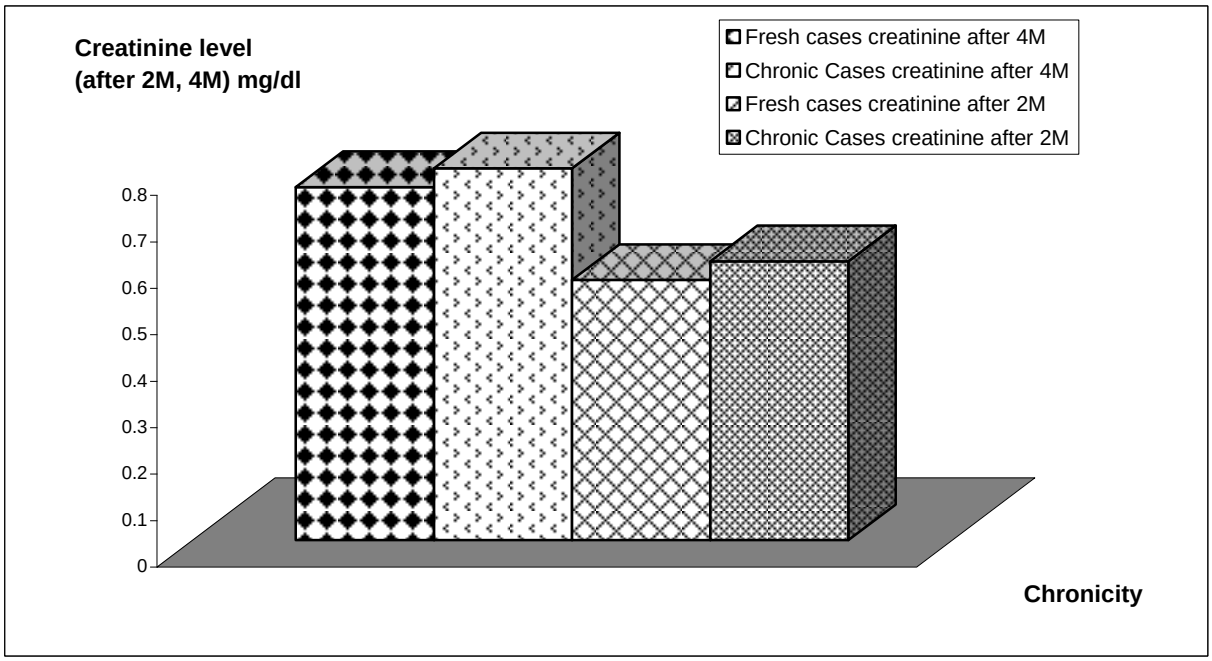

Fig (16): Statistical analysis of creatinine results after 2M.4M months respectively in recent (fresh) and (chronic cases).

Table (11) shows the comparison between the patient cases and control groups in uric acid and creatinine level.

The table show that the mean uric in cases 100 patients (5.2 mg/dl) but in control group 30 cases (4.8 mg/dl) the creatinine as the same level.

Table (11): Comparison between the patient cases α control groups in uric acid and creatinine level.

	Group	**N**	**Mean**	**SD**
Uric acid 2M	Cases	100	5.2	1.1285345
	Control	30	4.8	0.9127198
Creatinine 2M	Cases	100	0.6	0.1418884
	Control	30	0.7	0.1740657

P-value < 0.05
N = number of patients.