Results

This study included 33 cases of nasopharyngeal carcinoma (10 cases were squamous cell carcinoma & 23 cases were undifferentiated carcinoma) .6 cases of adjacent non tumoral tissue as a control as shown in Figure (6) .

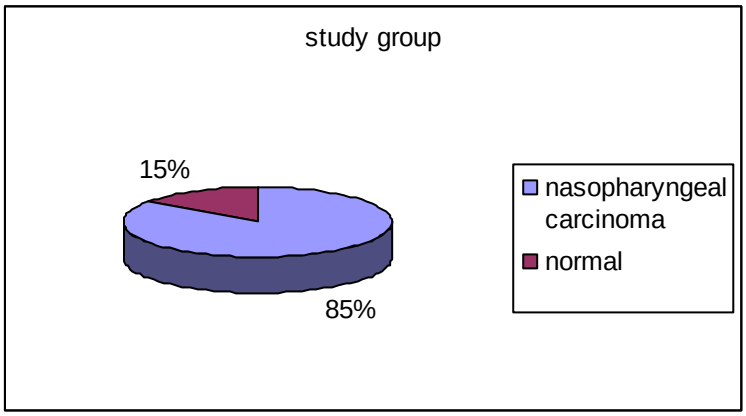


Figure (6): Study groups

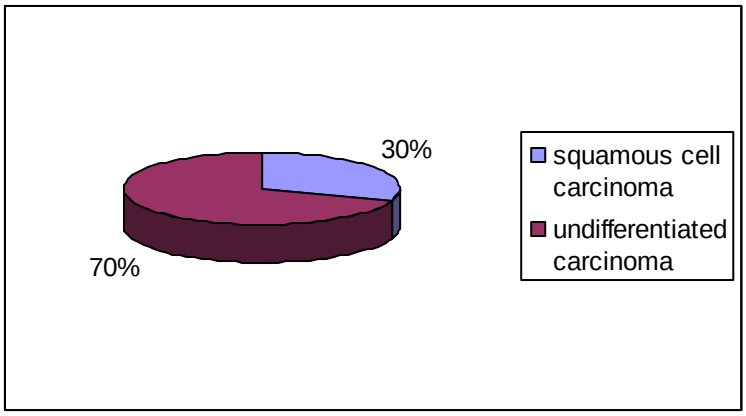


Figure (7) :Types of nasopharyngeal carcinoma

Age distribution of nasopharyngeal carcinoma cases :

Ages of the studied 33 cases were 5 (15.2%)cases aged between 15-25years , 6 cases (18.2%) between age 26-35years , 3 cases (9.1%) between age 36-45years , maximum age group was 7 cases (21%) between age 46-55years , 6 cases (18.2%) between age 56-65years , 5 cases (15.2%) between age 66-75years & 1 case (3.1%) age above 75years old this is shown in table (1) & Figure (8)

Table (1) :Age distribution of nasopharyngeal carcinoma cases

Age group	NO	%
15-25	5	15.2
26-35	6	18.2
36-45	3	9.1
46-55	7	21
56-65	6	18.2
66-75	5	15.2
>75	1	3.1

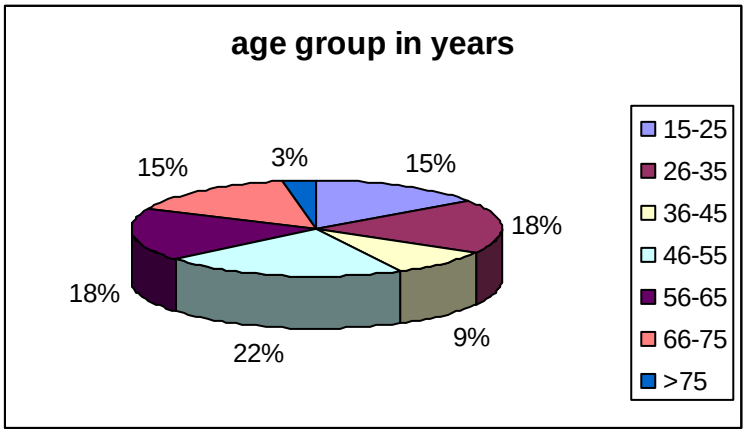


Figure (8): Age distribution of nasopharyngeal carcinoma cases

Table (2) :Age distribution of nasopharyngeal carcinoma cases according to the type

Age group	NO	Type			
		Squamous cell carcinoma		Undifferentiated carcinoma	
		NO	%	No	%
15-25	5	1	20	4	80
26-35	6	3	50	3	50
36-45	3	1	33	2	67
46-55	7	2	28.5	5	71.5
56-65	6	1	17	5	83
66-75	5	2	40	3	60
>75	1	0	0	1	100
Total	33	10	30.4	23	69.6

Gender distribution :

Out of 33 cases of nasopharyngeal carcinoma , 20 cases were males (60.5%) and 13 cases were female (39.5%) .It is illustrated in figure (9)with male to female ratio 1.5: 1 as shown in Figure (9) .

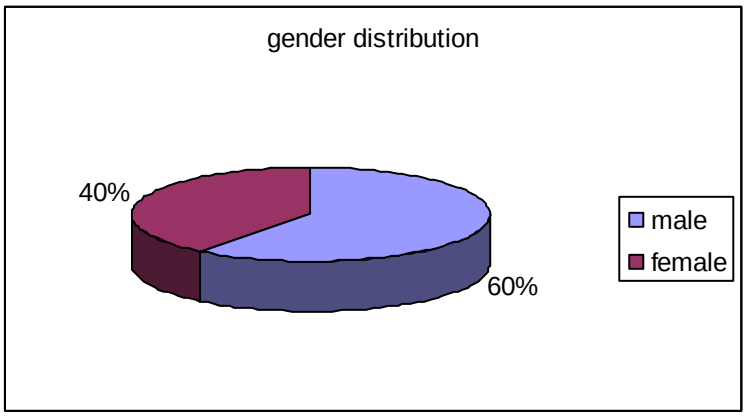


Figure (9): Gender distribution of nasopharyngeal carcinoma

Relation between histopathological type & Tumor grade :

Out of 10 cases (43.4%) of squamous cell carcinoma , 1 case (10%) was well differentiated , 6 cases (60%) were moderately differentiated & 3 cases (30%) were poorly differentiated .out of 23 cases (69.6%) of undifferentiated carcinoma , 1 case (4.3%) was well differentiated ,7 cases (30.4%) were moderately differentiated & 15 cases (65.3%) were poorly differentiated as shown in Table (3) & Figure (9) .

Table (3): Relation between histopathological type & grade

Histopathological type	No	%	grade					
			Well differentiated		Moderately differentiated		Poorly differentiated	
			No.	%	No.	%	No.	%
Squamous cell carcinoma	10	43.4	1	10	6	60	3	30
Undifferentiated carcinoma	23	69.6	1	4.3	7	30.4	15	65.3
Total	33		2	6	13	39.5	18	54.5

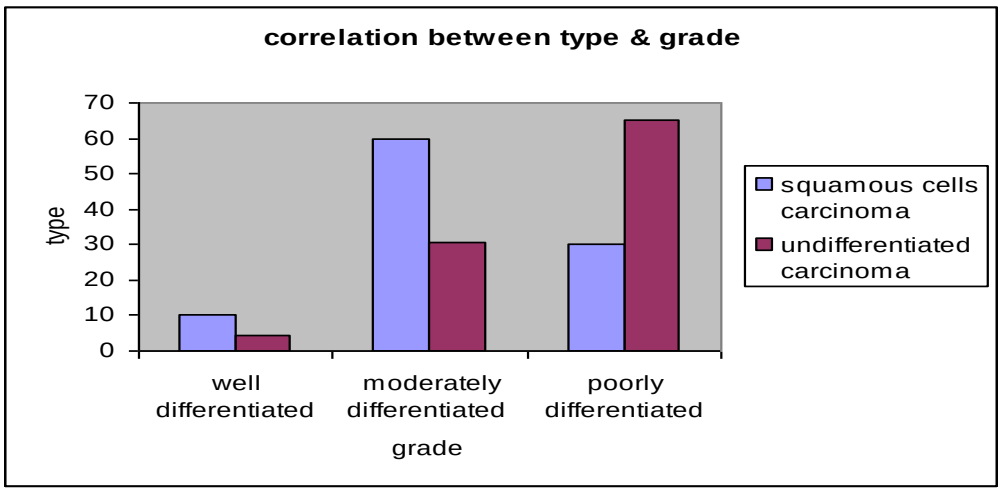


Figure (10): Relation between histopathological type & grade

TNM staging of nasopharyngeal carcinoma cases.

In this study, tumor staging was done according to TNM staging system .Out of 10 cases of squamous cell carcinoma , 1 case (10%) was stage I , 1 case (10%) was stage II , 1 case (10%) was stage III & 7 (70%) cases belonged to stage IV. Out of 23 cases of undifferentiated carcinoma , 6 (26%) cases belong to stage I , 8 cases(34.7%) were stage II , 4 cases(17.3%) were stage III& 5 cases (22%) were stage IV as shown in Table (4) & Figure (11) .

Table (4): Correlation between histopatholgical type & stage

Histopathological type	No. of cases	Stage							
		Stage I		Stage II		Stage III		Stage IV	
		No.	%	No.	%	No.	%	No.	%
Squamous cell carcinoma	10	1	10	1	10	1	10	7	70
Undifferentiated carcinoma	23	6	26	8	34.7	4	17.3	5	22
Total	33	7	21.2	9	27.3	5	15.2	12	36.3

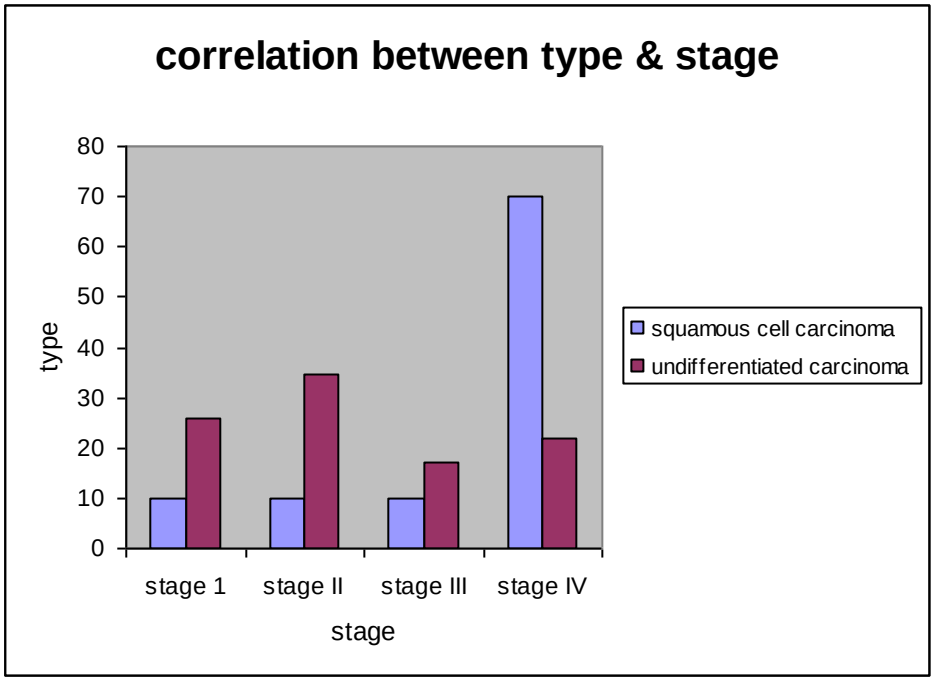


Figure (11) :Correlation between histopatholgical type & stage

If stage I and II were grouped as low stages; while stage III and IV were grouped as high stages. Out of 10 , 8 cases (80%) of squmaous cell carcinoma were high stage and 2 cases (20%) were low stage . out of 23 of undifferentiated carcinoma , 14 cases (60.8%) belonged to low stage& 9 cases (39.2%) were high stage .. A significant correlation between type and its TNM stage was detected ($p<0.05$) as squamous cell carcinoma showed high stage than undifferentiated carcinoma as shown in Table (5) .

Table (5): Correlation between histopatholgical type & stage

Histopathological type	**No. of cases**	**Stage**			
		Stage I& II (low stages)		**Stage III & IV (high stages)**	
		No.	**%**	**No.**	**%**
Squamous cell Carcinoma	10	2	20	8	80
Undifferentiated carcinoma	23	14	60.8	9	39.2
Total	33	16		17	

Correlation between histopathological type & T stage :

Out of 10 cases of squamous cell carcinoma , 1 cases (10%) was T1 , 1 cases (10%) was T2 , 1 cases (10%) was T3 & 7 cases (70%) were T 4 Out of 23 cases of undifferentiated carcinoma ,6 cases (26%) were T1 , 8 cases (35%) were T2 , 6 cases (26%) were T3 & 3 cases (13%) were T4 .**There was significant correlation between type & T stage (p <0.05)** as shown in Table (6) & Figure (12) .squamous cell carcinoma showed high depth of invasion than that of undifferentiated carcinoma.

Table (6): Correlation between type & T stage

Histopathological type	No. of cases	T stage							
		T 1		T2		T 3		T4	
		No.	%	No.	%	No.	%	No.	%
Squamous cell carcinoma	10	1	10	1	10	1	10	7	70
Undifferentiated carcinoma	23	6	26	8	35	6	26	3	13
Total	33	7	21.2	9	27.3	7	21.2	10	30.3

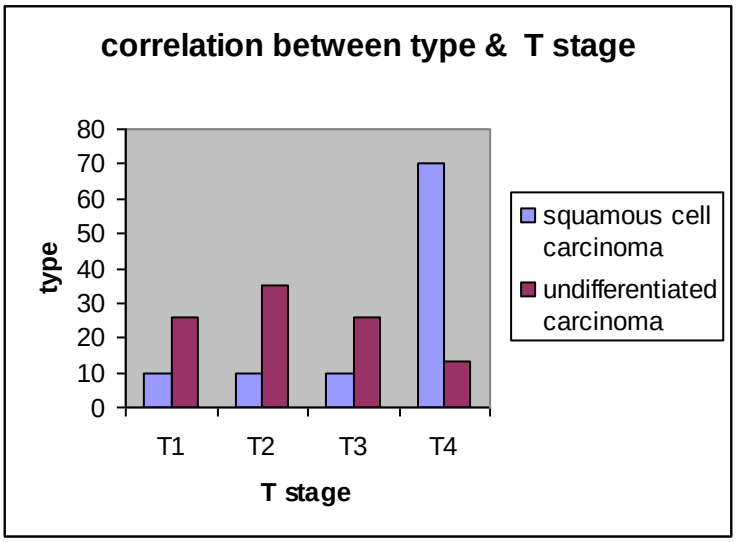


Figure (12): Correlation between type & T stage

Correlation between histopathological type & lymph node metastasis:

Out of 10 cases of squamous nasopharyngeal carcinoma , 3 case (30%) were –ve for lymph node metastasis , 7 case (7 0%) were positive for lymph node metastasis .out of 23 cases of undifferentiated carcinoma , 10 cases (43.4%) were –ve for lymph node metastasis , 13 cases (56.5%) were positive. **There was no significant correlation between type & L.N metastasis** was detected as shown in Table (7) & Figure (13) .

Table (7): Correlation between histopathological type & lymph node

Histopathological type	No. of cases	Lymph node			
		-ve		+ve	
		No.	%	No.	%
Squamous cell carcinoma	10	3	30	7	70
Undifferentiated carcinoma	23	10	43.4	13	56.5
Total	33	13	39.4	20	60.6

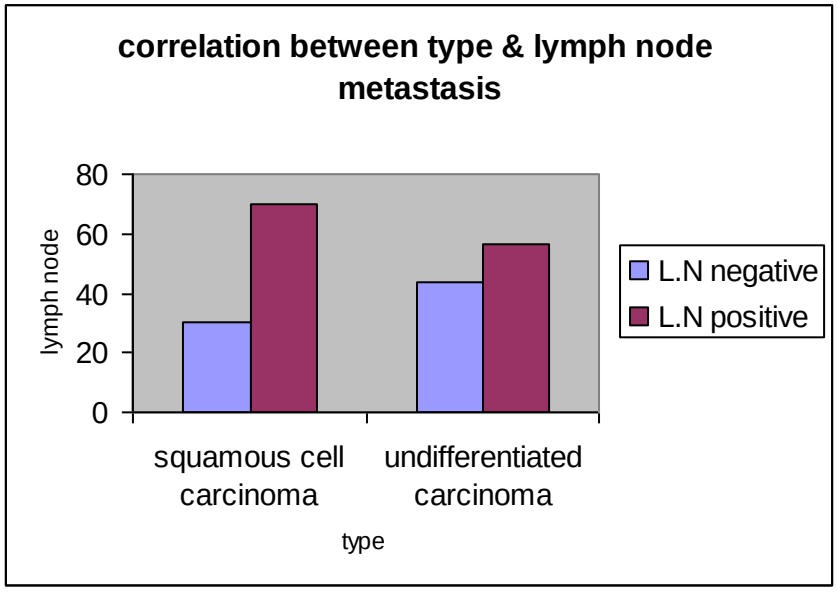


Figure (13): Correlation between histopathological type & lymph node

Correlation between histopathological type & distant metastasis:

Out of 10 cases of squamous cell carcinoma , 2 cases (20%) were M0& 8 cases (80%) were M1 out of 23 cases , 14 cases(61%) were M0& 9 cases (39%) were M1 . **There was significant correlation between type & distant metastasis** (p <0..05) squamous cell carcinoma showed distant metastasis more than undifferentiated carcinoma as shown in Table (8) & Figure (14) .

Table (8): Correlation between histopathological type & distant metastasis

Histopathological type	No. of cases	metastasis			
		M0		M1	
		No.	%	No.	%
Squamous cell carcinoma	10	2	20	8	80
Undifferentiated carcinoma	23	14	60.8	9	38.2
Total	33	16	48.5	17	51.5

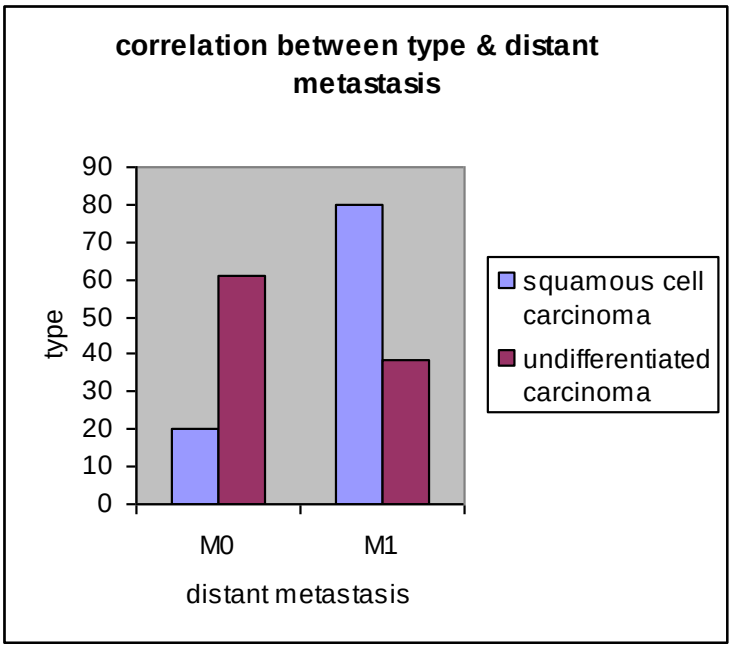


Figure (14): Correlation between histopathological type & distant metastasis

Correlation between histopathological type & 3 year survival:

Out of 10 cases (30.3%) of squamous cell carcinoma , 2 cases (20%) were free , 2 cases (20%) were recurrent & 6 cases (60%) were dead .out of 23 cases(69.7%) of undifferentiated carcinoma , 10 cases (43.5%) were free , 7 cases (30.4%) were recurrent & 6 cases (26.1%) were dead. **There was no significant correlation between histopathological type & 3 year survival** as shown in Table (9) & Figure (15) .

Table (9): Relation between histopathological type & 3 year survival

Histopathological type	No. of cases	%	3 year survival							
			Free		Recurrent		dead		Recurrent / dead	
			No.	%	No	%	No	%	No.	%
Squamous cell carcinoma	10	30.3	2	20	2	20	6	60	8	80
Undifferentiated carcinoma	23	69.7	10	43.5	7	30.4	6	26.1	13	56.5
Total	33		12	36.4	9	27.2	12	36.4	21	63.6

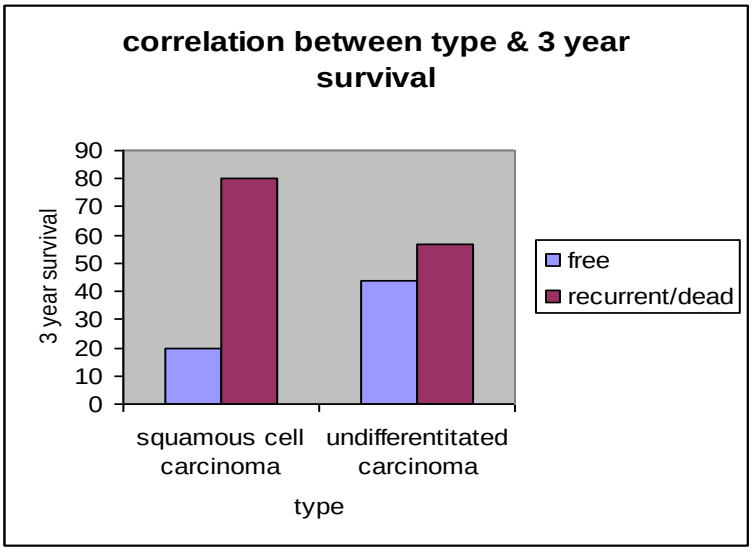


figure (15): Relation between histopathological type & 3 year survival

Figure (16); Nonkeratinizing Nasopharyngeal carcinoma, undifferentiated subtype. The cells exhibit a syncytial quality, and possess vesicular nuclei, prominent nucleoli and lightly eosinophilic cytoplasm with intermingled lymphocytes (H& E X400).

Figure (17):Nonkeratinizing nasopharyngeal carcinoma, undifferentiated subtype. So-called lymphoepithelial carcinoma, characterized by lymphoid cells apparently breaking up the tumour into tiny aggregates, rendering it difficult to appreciate the epithelial nature of the neoplasm (H& E X400)

Figure (18): Nonkeratinizing nasopharyngeal carcinoma, undifferentiated subtype. This case comprises spindle cells with dark-staining nuclei and inconspicuous nucleoli ((H& E x400)

Figure (19): Nonkeratinizing nasopharyngeal carcinoma undifferentiated subtype.with small foci of primitive squamous differentiation,. There are some intermingled lymphocytes (H& E X400)

Figure (20) : Nonkeratinizing nasopharyngeal carcinoma. The carcinoma cells can assume aplump or slender spindle shape focally or extensively, with formation of streaming fascicles. The nucleoli of the spindle cells are often not as prominent as the syncytial-appearing cells (H& E X400).

Figure (21): Squamous cell carcinoma, Well differentiated. (H& E X200) .

Figure (22): Squamous cell carcinoma, Moderately differentiated (H& E X400)

Figure (23): Squamous cell carcinoma, Poorly differentiated . (H& E X200)

Correlation between Tumor grade & 3 year survival:

Out of 2 cases (6%) of well differentiated carcinoma , 1 case (50%) was free , no cases were recurrent & 1 cases was(50%) was dead .out of 13 cases (39.4%) of moderately differentiated carcinoma , 4 cases (30.7%) were free , 3 cases (23.1%) were recurrent & 6 cases (46.2%) were dead .out of 18 cases (54.6%) of poorly differentiated carcinoma , 7 cases (39%) were free , 6 cases (33.3%) were recurrent & 5 cases (27.7%) were dead .**There was no significant correlation between tumor grade & 3 year survival** as shown in Table (10) & Figure (24) .

Table (10): Correlation between grade& 3 year survival

Tumor grade	No	%	3 year survival							
			Free		Recurrent		dead		Recurrent / dead	
			No.	%	No	%	No	%	No.	%
Well differentiated	2	6	1	50	0	0	1	50	1	50
Moderately differentiated	13	39.4	4	30.7	3	23.1	6	46.2	9	69.3
Poorly differentiated	18	54.6	7	39	6	33.3	5	27.7	11	61
Total	33	33	12	36.4	9	27.2	12	36.4	21	63.6

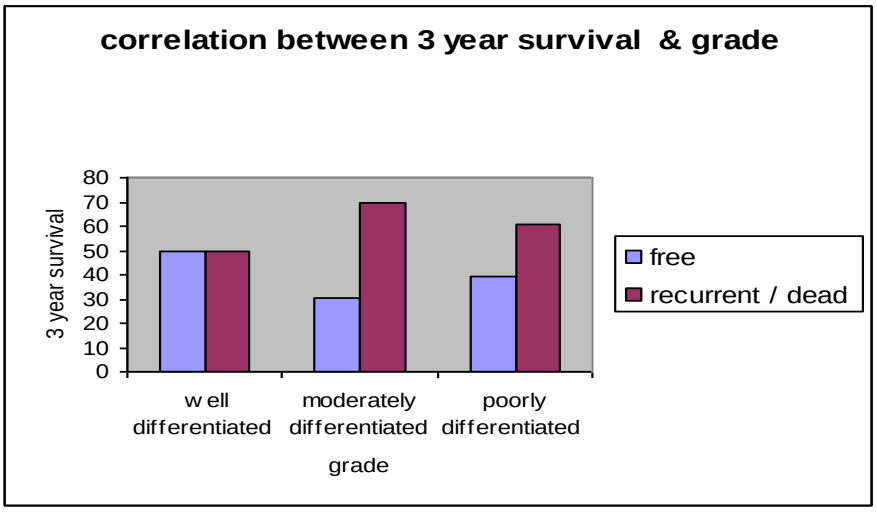


Figure (24): Correlation between grade & 3 year survival

Correlation between T stage & 3 year survival :

Out of 7 cases (21.2%) of T1 , 5 cases (71.6%) were free , 1 cases (14.2%) was recurrent & 1 case (14.2%) was dead . out of 8 cases (24.2%) of T2 , 4 cases (50%) were free , 3 case (37.5%) were recurrent & 1case (12.5%) was dead . out of 8 cases (24.2%) of T3 , 2 cases (25%) were free ,2 cases (25%) were recurrent & 4 cases(50%) were dead . out of 10 cases (30.4%) of T4, 1 case (10%) was free , 3 cases (30%) were recurrent & 6 cases (60%) were dead . **There was significant correlation between T stage & 3 year survival** ($p < 0.05$) as shown in Table (11) & Figure (25) . Cases with higher depth of invasion had poorer prognosis (short overall & 3 year survival).

Table (11): Correlation between T stage & 3 year survival

T stage	NO	%	3 year survival							
			free		recurrent		Dead		Recurrent/ dead	
			No	%	No	%	No	%	No	%
T1	7	21.2	5	71.6	1	14.2	1	14.2	2	28.4
T2	8	24.2	4	50	3	37.5	1	12.5	4	50
T3	8	24.2	2	25	2	25	4	50	6	75
T4	10	30.4	1	10	3	30	6	60	9	90
Total	33		12	36.4	9	27.2	12	36.4	21	63.6

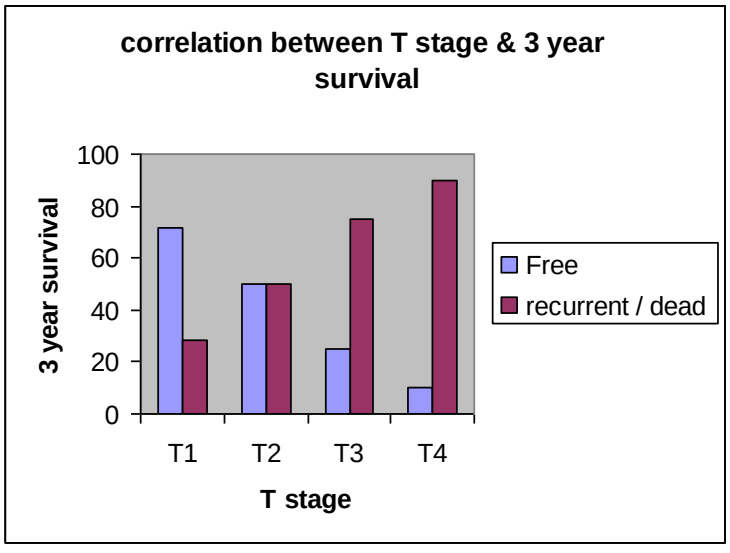


Figure (25): Correlation between T stage & 3 year survival

Correlation between lymph node metastasis & 3 year survival :

Out of 13 cases (39.4%) of –ve lymph node metastasis , 9 cases (69.2%) were free , 1 case (7.7%) was recurrent & 3 cases (23.1%) were dead .out of 20 cases(60.6%) of +ve lymph node metastasis , 3 cases (15%) were free , 8 cases (40%) were recurrent & 9 cases (45%) were dead **. There was significant correlation between histopathological lymph node metastasis & 3 year survival** ($p<0.05$) as shown in Table (12) & Figure (26) .The cases with positive lymph node metastasis had poor 3 year survival than –ve cases .

Table (12) :Correlation between lymph node metastasis & 3 year survival

Lymph node	No. of cases	%	3 year survival							
			Free		Recurrent		dead		Recurrent / dead	
			No.	%	No	%	No	%	No.	%
-ve	13	39.4	9	69.2	1	7.7	3	23.1	4	30.8
+ve	20	60.6	3	15	8	40	9	45	17	85
Total	33		12	36.4	9	27.2	12	36.4	21	63.6

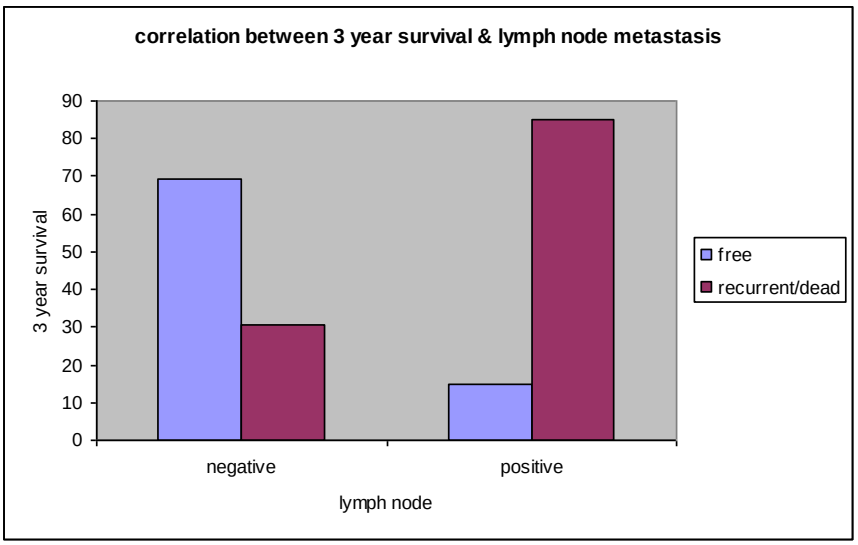


Figure (26) :Correlation between lymph node metastasis & 3 year survival

Correlation between distant metastasis & 3 year survival :

Out of 21 cases (63.6%) of M0 , 10 cases (47.6%) were free , 5 cases (23.8%) were recurrent & 6 cases (28.6%) were dead . out of 12 cases(36.4%) of M1 , 2 cases (16.6%) were free , 4 cases (33.4%) were recurrent & 6 cases (50%) were dead . **No significant correlation between 3 years disease free survival & distant metastasis** was detected as shown in Table (13) & Figure (27) .

Table (13): Correlation between distant metastasis & 3 year survival

metastasis	NO	%	3 year survival							
			free		Recurrent		Dead		Recurrent/ dead	
			No	%	No	%	No	%	No	%
M0	21	63.6	10	47.6	5	23.8	6	28.6	11	52.4
M1	12	36.4	2	16.6	4	33.4	6	50	10	83.4
Total	33		12	36.4	9	27.2	12	36.4	21	63.6

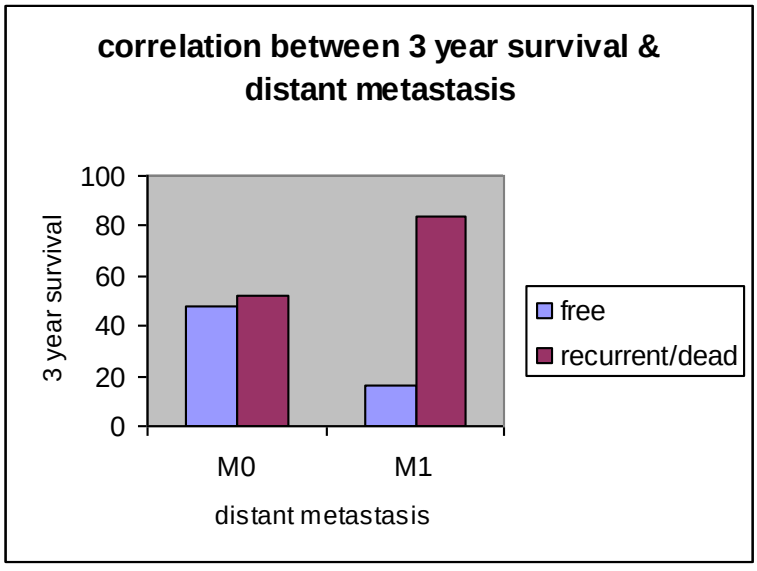


Figure (27) :Correlation between distant metastasis & 3 year survival

Correlation between Tumor stage & 3 year survival :

Out of 7 cases (21.2%) of stage I , 5 cases (71.4%) were free , 1 case (14.3%) was recurrent & 1 case(14.3%) was dead . out of 9 cases (27.2%) of stage II, 4 cases (44.5%) were free , 3 cases (33.3%) were recurrent &2 cases (22.2%) were dead . out of 5 cases (15.2%) of stage III , 1 cases (20%) was free , 1 case (20%) was recurrent & 3 cases (60%) were dead .out of 12 cases (36.4%) of stage IV , 2 cases (16.7%) were free , 3 cases (25%) were recurrent & 7 cases (58.3%) were dead . **There was significant correlation between stage & 3 year survival** (p <0.05) as shown in Table (14) & Figure (28) . The cases with advanced stage had short overall survival than cases with early stages.

Table (14) :Correlation between Tumor stage & 3 year survival

Stage	NO	%	3 year survival							
			Free		recurrent		dead		Recurrent/ dead	
			No	%	No	%	No	%	No	%
Stage I	7	21.2	5	71.4	1	14.3	1	14.3	2	28.6
Stage II	9	27.2	4	44.5	3	33.3	2	22.2	5	55.5
Stage III	5	15.2	1	20	1	20	3	60	4	80
Stage IV	12	36.4	2	16.7	3	25	7	58.3	10	83.3
Total	33		12	36.4	8	24.2	13	39.4	22	63.6

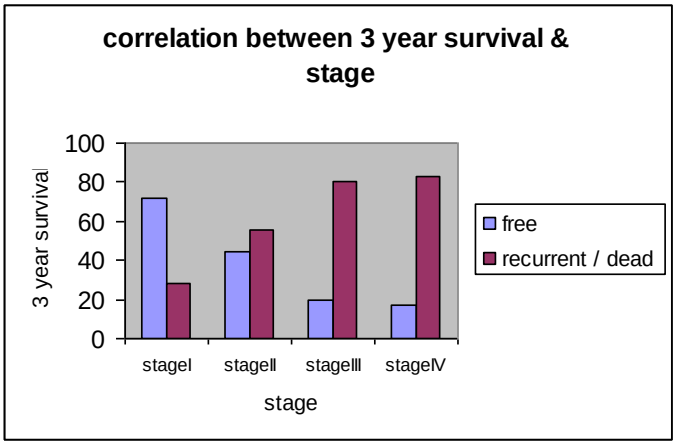


Fig (28):Correlation between Tumor stage & 3 year survival

Morphometric results :

MNA(mean nuclear area):

The MNA for control cases was **20.36 μ^2** while the MNA(mean nuclear area) for malignant cases was **46.9 μ^2.** This value could be used as a cut off point to distinguish the cases as 2 groups; group 1 with MNA ≤ 46.9 μ^2 and group 2 with MNA > 46.9μ^2 to correlate with behaviour of the tumor

Relation between MNA & histopathological type :

MNA for squamous cell carcinoma was **54.35** μ^2 & MNA for undiffentiated carcinoma was **42.40**μ^2 . This may be indicate that squamous cell carcinoma has an aggressive behavior than undiffentiated carcinoma as shown in Table (15) & Figure (29).

Table (15) :Relation between MNA & histopathological type

Type	No	Range	MNA	S.D
squamous cell carcinoma	10	33.1-84.2	54.35μ^2	±16.31
Undifferentiated carcinoma	23	25.9-70	42.40μ^2	± 10.15
Total	33	25.9-84.2	46.02μ^2	±13.30

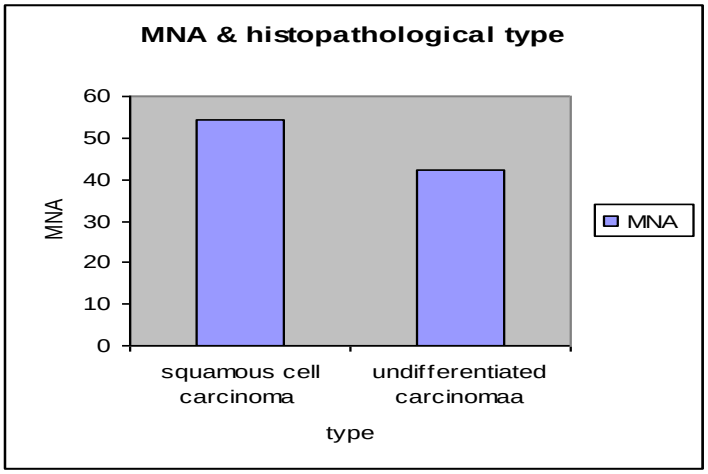


Figure (29) : MNA for Histopathological types

Correlation between MNA & Tumor grade :

MNA for well differentiated carcinoma was 51.80μ^2, MNA for moderately differentiated carcinoma was 47.18μ^2 .MNA for poorly differentiated carcinoma was 44.55μ^2 . **There was no significant correlation between MNA & grade** as shown in Table (16) & Figure (30) .

Table (16): Correlation between MNA & grade

grade	No	MNA	S.D
Well differentiated	2	51.80μ^2	±21.35
Moderately differentiated	13	47.18μ^2	±17.23
Poorly differentiated	18	44.55μ^2	±9.44
Total	33	46.02μ^2	±13.30

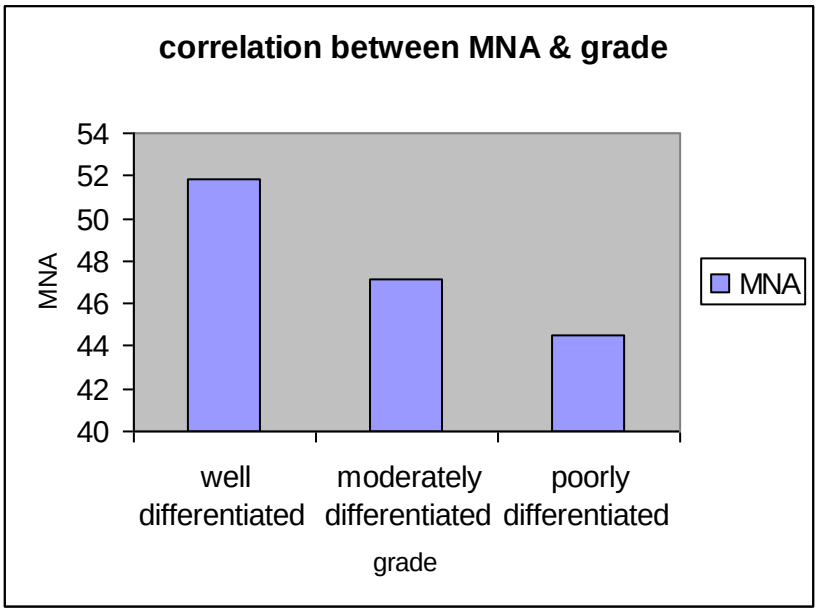


Figure (30): Correlation between MNA & grade

Correlation between MNA & T stage :

The MNA of NPC cases in T 1 and T2 were very close, and lower than the cut off point 46.9 (35.15μ^2 and 38.73μ^2 respectively), while the MNA of NPC cases in T3 and T4 were also very close, and higher than the cut off point (52.20μ^2 and 55.87μ^2 respectively). **There was a significant correlation between MNA and T stage** ($p<0.05$) as shown in Table (17) & Figure (31).

Table (17): Correlation between MNA and T stage

T stage	No	MNA	S.D
T1	7	35.15μ^2	±3.52
T2	9	38.73μ^2	±5.97
T3	7	52.20μ^2	±3.57
T4	10	55.87μ^2	±17.25
Total	33	46.02μ^2	±13.30

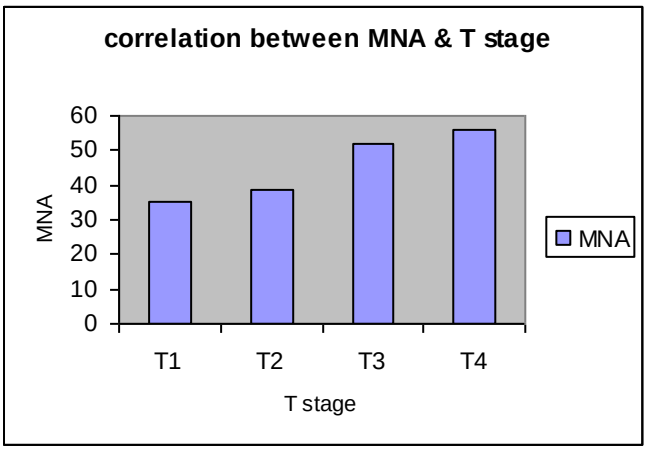


Figure (31): Correlation between MNA and T stage

Correlation between MNA& lymph node metastasis:

The MNA of NPC cases with negative lymph node metastasis was lower than the cut off point 46.9 39.15μ^2, while the MNA of NPC cases with positive lymph node metastasis was higher than the cut off point 50.58μ^2. **There was a significant correlation between MNA and Lymph node metastasis** ($p<0.05$) as shown in Table (18) & Figure (32)

Table (18): Correlation between MNA and lymph node metatstasis

Lymph node	No	MNA	S.D
-ve	13	39.0μ^2	±6.61
+ve	20	50.58μ^2	±14.56
Total	33	46.02μ^2	±13.30

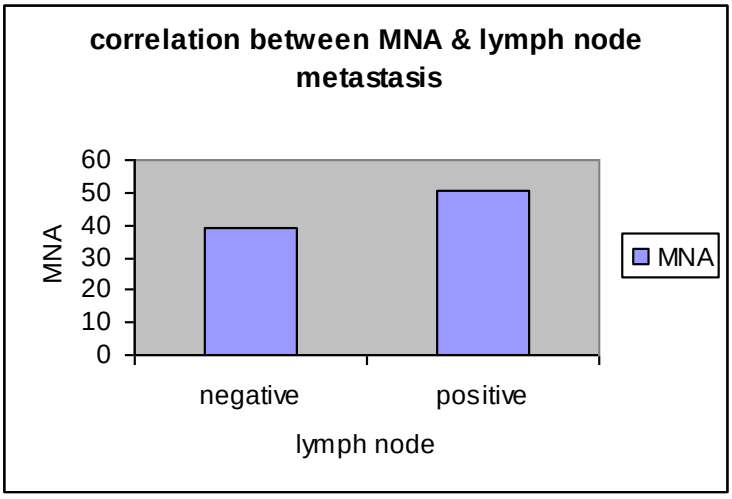


Figure (32): Correlation between MNA and lymph node metatstasis

Correlation between MNA & distant metastasis :

The MNA of NPC cases in M0 was lower than the cut off point 46.9 (41.01μ^2), while the MNA of NPC cases in M1 was higher than the cut off point (54.79μ^2). **There was a significant correlation between MNA and distant metastasis** ($p<0.05$) as shown in Table (19) & Figure (33).

Table (19): Correlation between MNA and distant metatstasis

Metastasis	No	MNA	S.D
M0	**21**	**41.01μ^2**	**±8.51**
M1	**12**	**54.79μ^2**	**±15.85**
Total	**33**	**46.02μ^2**	**±13.30**

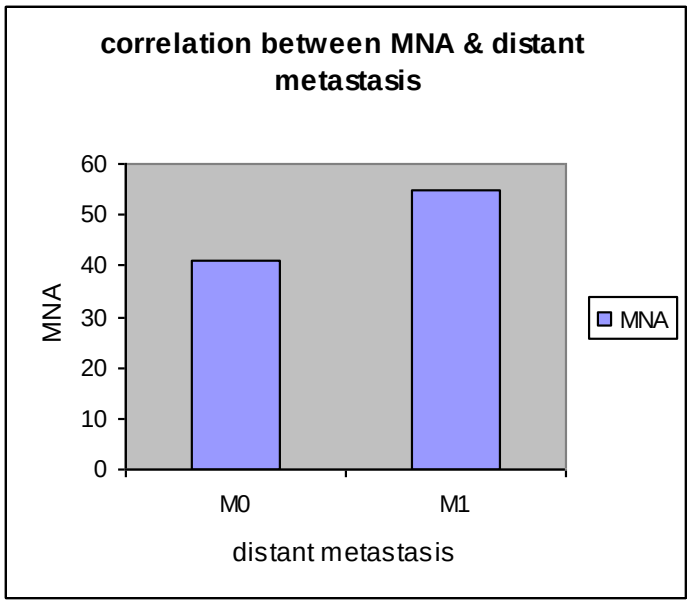


Figure (33) Correlation between MNA and distant metatstasis

Correlation between MNA& Tumor stage :

The MNA of NPC cases in stages I and II were very close, and lower than the cut off point 46.9 ($35.15\mu^2$ and $38.73\mu^2$ respectively), while the MNA of NPC cases in stages III and IV were also very close, and higher than the cut off point ($53.34\mu^2$ and $54.79\mu^2$ respectively). **There was a significant correlation between MNA and tumor stage** ($p< 0.05$) as shown in Table (20) & Figure (34).

Table (20): Correlation between MNA and Tumor stage

TNM stage	No	MNA	S.D
Stage 1	7	$35.15\mu^2$	±3.52
Stage II	9	$38.73\mu^2$	±5.97
Stage III	5	$53.34\mu^2$	±3.23
Stage IV	12	$54.79\mu^2$	±15.85
Total	33	$46.02\mu^2$	±13.30

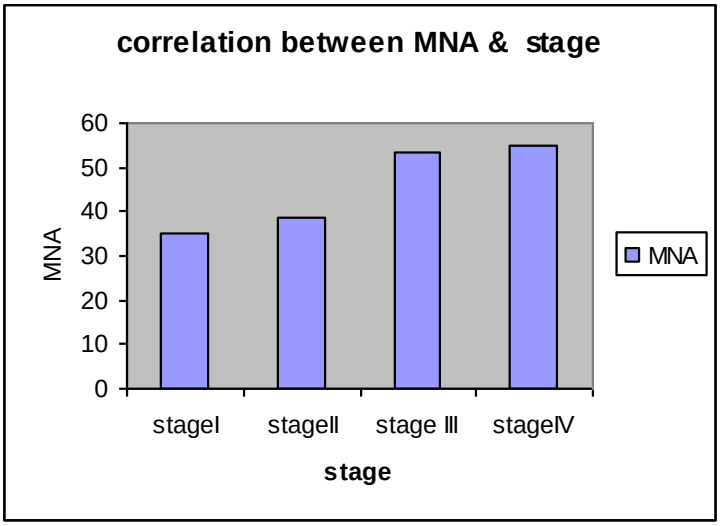


Figure (34): Correlation between MNA and Tumor stage

Correlation between MNA& 3 year survival :

The MNA of free 3 year survival cases was lower than the cut off point 46.9 ($40.92\mu^2$), while the MNA of recurrent /dead cases was higher than the cut off point ($48.94\mu^2$). **There was a significant correlation between MNA and 3 year survival** ($p<0.05$) as shown in Table (21) & Figure (35).

Table (21): Correlation between MNA and 3 year survivial

3 years survival	No	MNA	S.D
free	12	$40.92\mu^2$	±10.9
Recurrent	9	$43.86\mu^2$	±9.76
Dead	12	$52.75\mu^2$	±15.84
Recurrent/dead	21	$48.94\mu^2$	±13.89
Total	33	$46.02\mu^2$	±13.30

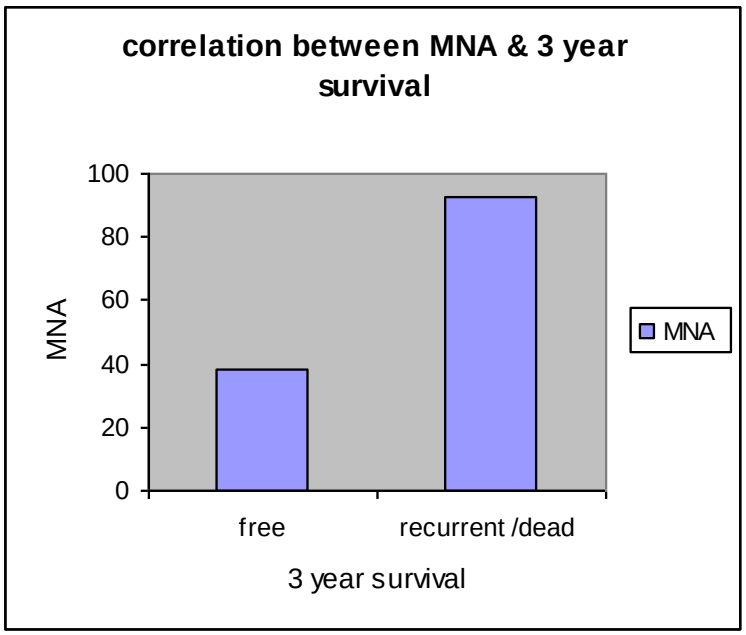


Figure (35) :Correlation between MNA and 3 year survival

Mean Nuclear Elongation Factor (MNEF):

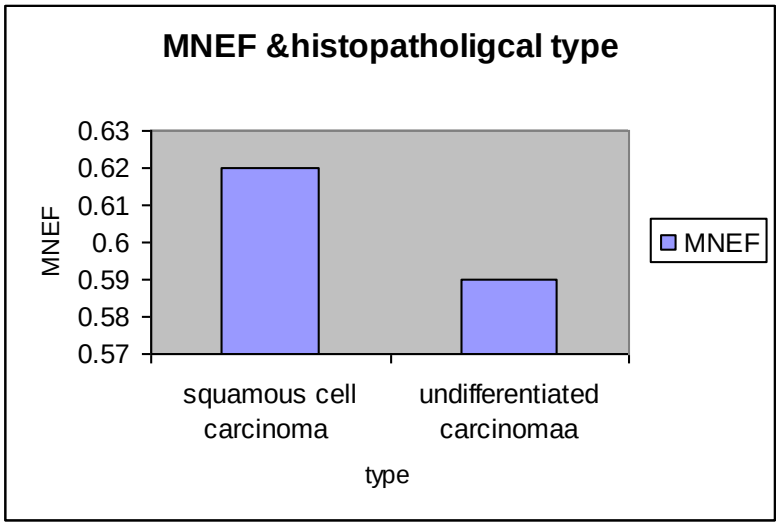
- The MNEF is the result of division of Mmnd on MMND .MNEF for control cases were 0.5 μ while MNEF for nasopharyngeal carcinoma cases was 0.60μ.

Relation between MNEF & histpathological type :

MNEF for squamous cell carcinoma was 0.62μ while MNEF for undifferentiated carcinoma was 0.59μ as shown in Table (22) & Figure (36) .

Table (22): Relation between MNEF & histpathological type

Type	No	Range	MNEF	S.D
squamous cell carcinoma	10	0.52-0.83	0.62μ	±0.50
Undifferentiated carcinoma	23	0.34-0.70	0.59μ	± 0.52
Total	33	0.34-0.83	0.60μ	±0.50



Figure(36) :Relation between MNEF & histpathological type

Correlation between MNEF& Tumor grade:

MNEFfor well differentiated carcinoma was 0.61µ , MNEF for moderately differentiated carcinoma was 0.58 µ .MNEF for poorly differentiated carcinoma was 0.61µ . **There was no significant correlation between MNEF& grade** as shown in Table (23) & Figure (37).

Table (23): Correlation between MNEF& grade

Grade	No	MNEF	S.D
Well differentiated	2	0.61µ	±0.71
Moderately differentiated	13	0.58µ	±0.52
Poorly differentiated	18	0.61µ	±0.46
Total	33	0.60µ	±0.50

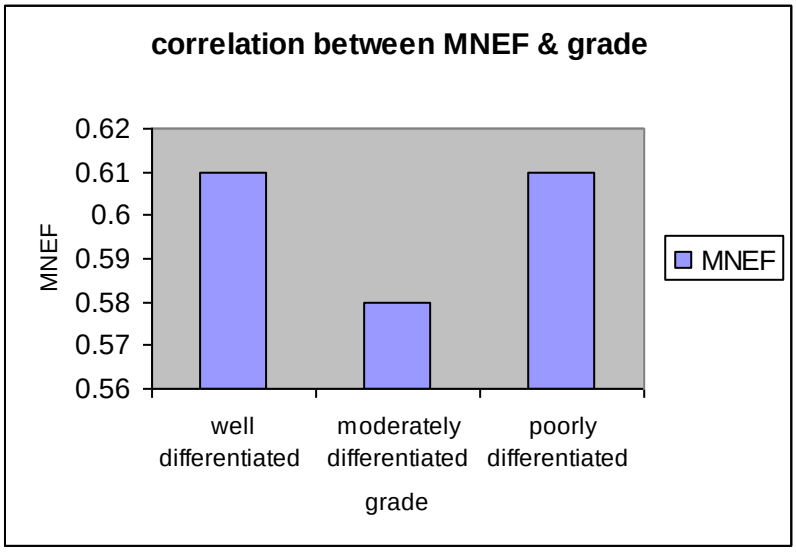


Figure (37): Correlation between MNEF& grade

Correlation between MNEF& T stage :

MNEF for T1 was 0.60µ , MNEF for T2 and T3 was 0 .56µ. , MNEF for T4 was 0.64µ .**There is no significant correlation between MNEF & T stage** as shown in Table (24) & Figure (38) .

Table (24): Correlation between MNEF & tumor size

T stage	No	MNEF	S.D
T1	7	0.60µ	±0.53
T2	8	0.57µ	±0.53
T3	8	0.57µ	±0.53
T4	10	0.64µ	±0.42
Total	33	0.60µ	±0.50

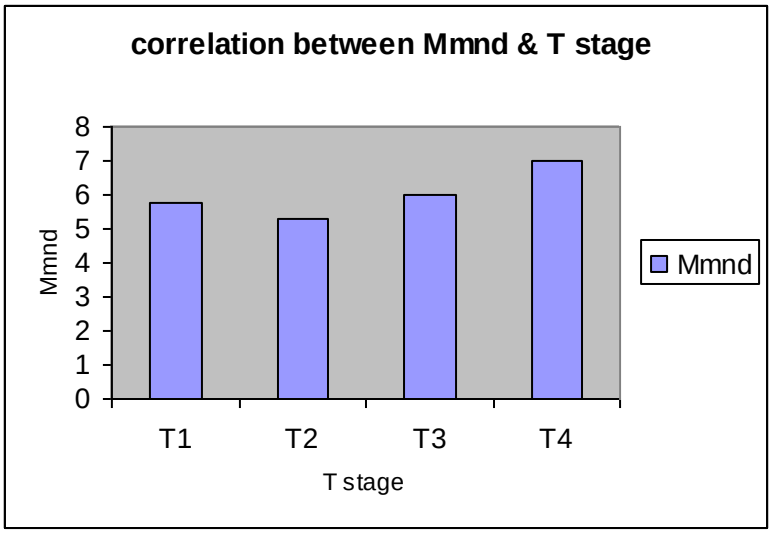


Figure (38): Correlation between MNEF & tumor size

Correlation between MNEF& Lymph node metastasis:

MNEF for both negative & positive lymph node metastasis was 0.60µ . **There was no significant correlation between MNEF and Lymph node metastasis** as shown in Table (25) & Figure (39).

Table (25): Correlation between MNEF & lymph node metastasis

Lymph node	No	MNEF	S.D
-ve	13	0.60µ	±0.52
+ve	20	0.60µ	±0.49
Total	33	0.60µ	±0.50

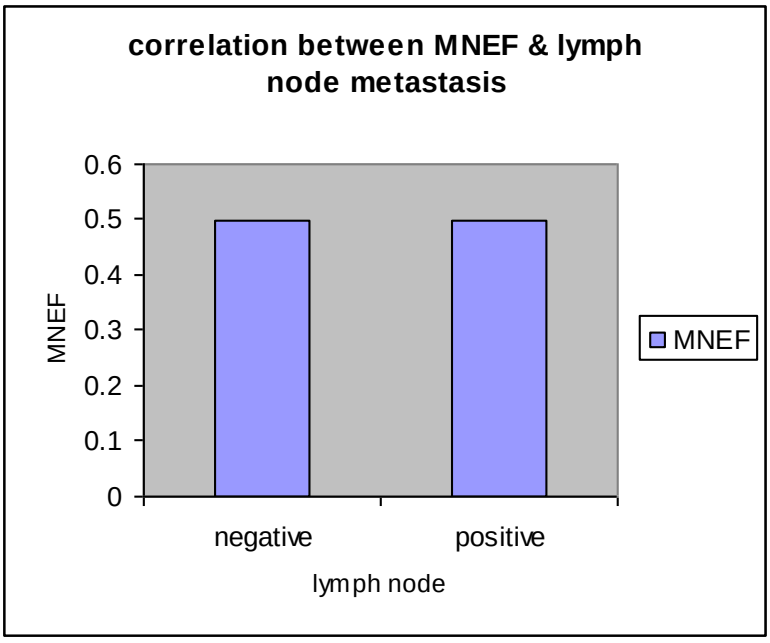


Figure (39) :Correlation between MNEF& lymph node metastasis

Correlation between MNEF & distant metastasis:

MNEF for M0 was 0.57µ while MNEF for M1 was 0.64µ. **There was no significant correlation between MNEF & distant metastasis** as shown in Table (26) & Figure (40) .

Table (26): Correlation between MNEF & distant metastasis

Metastasis	No	MNEF	S.D
M0	21	0.57µ	±0.51
M1	12	0.64µ	±0.39
Total	33	0.60µ	±0.50

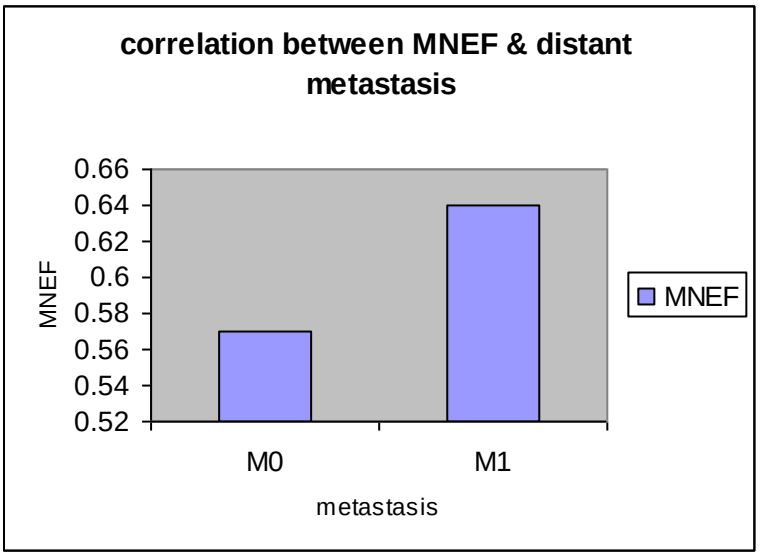


Figure (40): Correlation between MNEF& distant metastasis

Correlation between MNEF & Tumor stage :

MNEF for stage I was 0.60 µ ,MNEF for stage II was 0.56µ , MNEF for stage III was 0.55µ & MNEF for stage IV was 0.64 µ. **There was no significant correlation between MNEF & stage** as shown in Table (27) & Figure (41).

Table (27): Correlation between MNEF & stage

TNM stage	No	MNEF	S.D
Stage 1	7	0.60µ	±0.53
Stage II	9	0.56µ	±0.53
Stage III	5	0.55µ	±0.45
Stage IV	12	0.64µ	±0.38
Total	33	0.60µ	±0.50

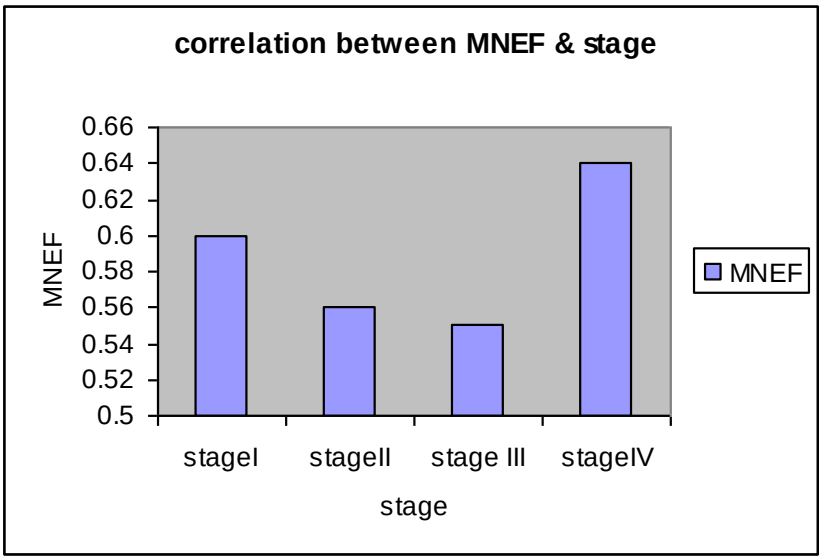


Figure (41): Correlation between MNEF & stage

Correlation between MNEF & 3 year survival :

MNEF for free 3 year survival was 0.59µ while MNEF for recurrent/ dead cases were 0.60µ . Although table showed increase in MNEF from cases with free survival , recurrent & dead cases .**There was no significant correlation between MNEF & 3 year survival** as shown in Table (28) & Figure (42).

Table (28): Correlation between MNEF & 3 year survival

3 years survival	No	MNEF	S.D
Free	11	0.59µ	±0.51
recurrent	7	.60µ	0.44 ±
dead	15	.61µ	± 0.52
Recurrent/dead	22	0.60µ	±0.50
Total	33	0.60µ	±0.50

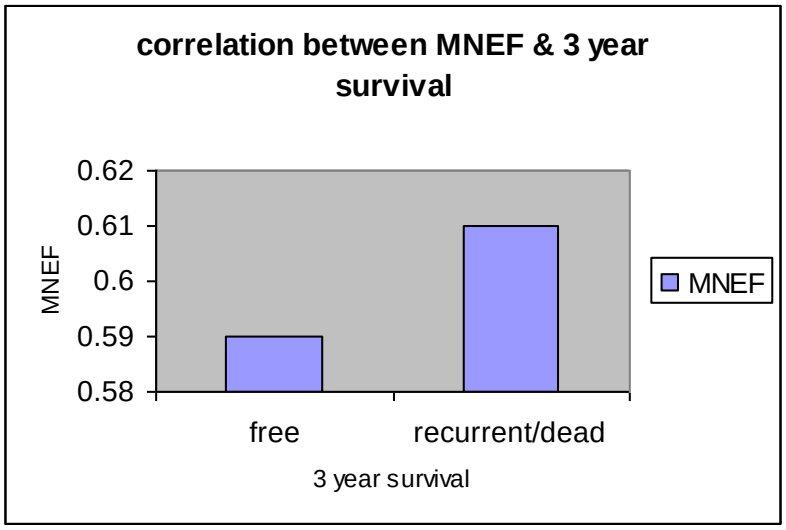


Figure (42): Correlation between MNEF& 3 years survival

Mean minimum nuclear diameter (Mmnd):

Mmnd for normal cases was 3.98μ and for malignant cases was 6.07μ.

Relation between Mmnd & histpathological type :

Mmnd for squamous cell carcinoma was 6.67μ while Mmnd for undifferentiated carcinoma was 5.80μ. . There was significant correlation between Mmnd & histopathological type ($p<0.05$) as **Mmnd for squamous cell carcinoma cases is higher than in undifferentiated carcinoma** as shown in Table (29) & Figure (43).

Table (29): Relation between Mmnd & histpathological type

Type	No	Range	Mmnd	S.D
Squamous cell carcinoma	10	4.7-8.9	6.67μ	± 1.38
Undifferentiated carcinoma	23	3.9-8.1	5.80μ	± .98
Total	33	3.9-8.9	6.07μ	±1.17

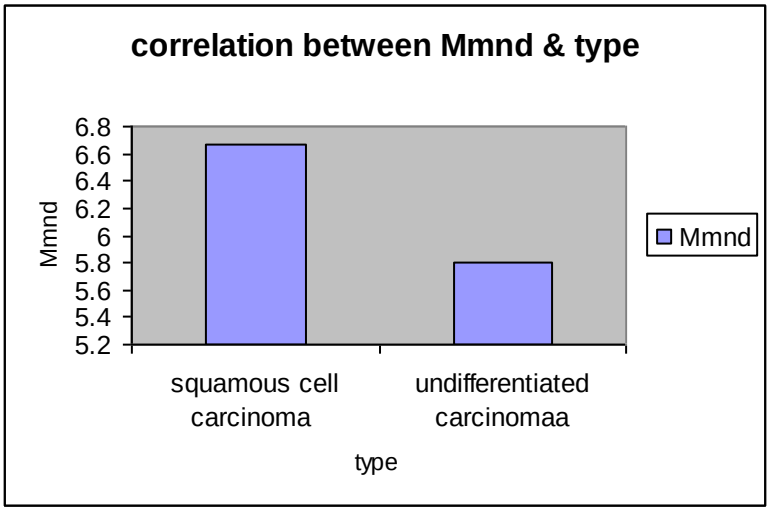


figure (43): Relation between Mmnd & histpathological type

Correlation between Mmnd & grade:

Mmnd for well differentiated carcinoma was 6.87µ, Mmnd for moderately differentiated carcinoma was 6.04µ.. Mmnd for poorly differentiated carcinoma was 5.99 µ.. **There was no significant correlation between Mmnd & grade** as shown in Table (30) & Figure (44).

Table (30) :Correlation between Mmnd & grade

grade	No	Mmnd	S.D
Well differentiated	2	6.87µ	± 1.94
Moderately differentiated	13	6.04µ	±1.42
Poorly differentiated	18	5.99µ	±0.91
Total	33	6.07µ	±1.17

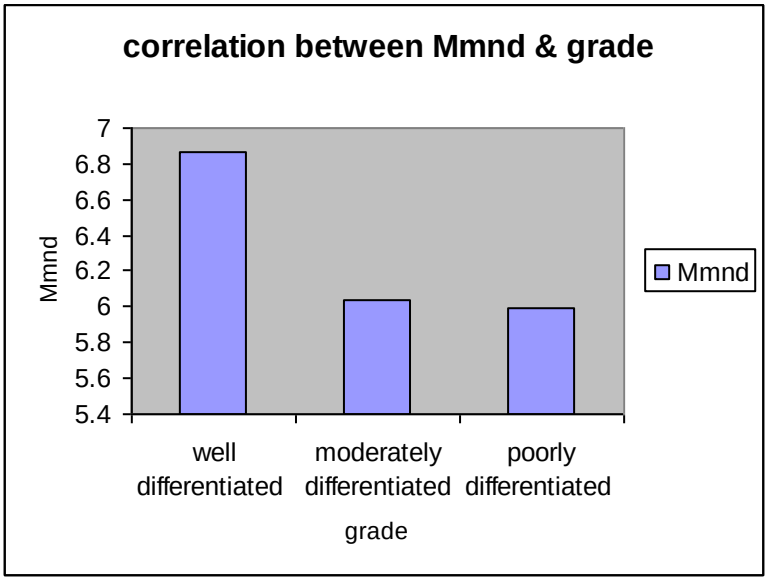


Figure (44): Correlation between Mmnd & grade

Correlation between Mmnd & T stage :

The Mmnd of NPC cases in T1 & T2 was **5.75**µ , T2 & T3 (**5.75**µ and **5.32**µ respectively), while the Mmnd of NPC cases in T4 were **6.99**µ . **There was a significant correlation between Mmnd and T stage** ($p<0.05$) as shown in Table (31) & Figure (45).

Table (31): Correlation between Mmnd & T stage

T stage	No	Mmnd	S.D
T1	7	5.75µ	±.82
T2	9	5.32µ	±1.07
T3	7	6.02µ	±.38
T4	10	6.99µ	±1.30
Total	33	6.07µ	±1.17

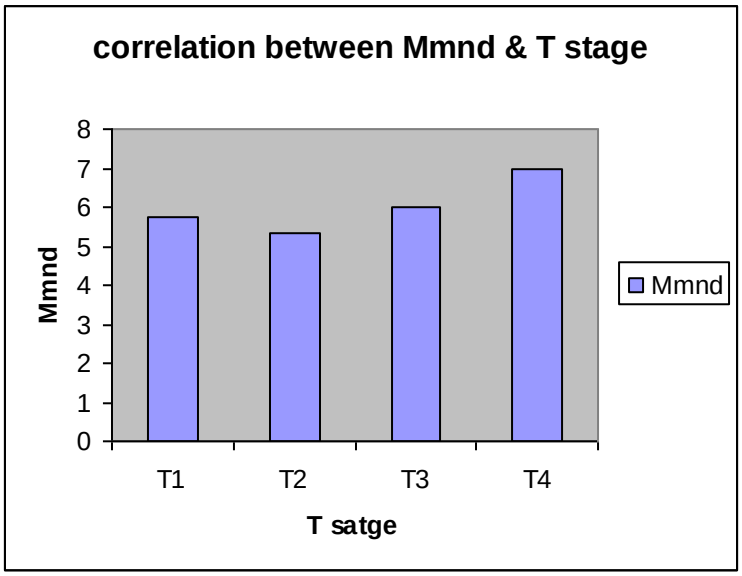


figure (45) :Correlation between Mmnd & T stage

Correlation between Mmnd & lymph node metstasis :

The Mmnd of NPC cases with negative lymph node metastasis was **5.70**μ while the Mmnd of NPC cases with positive lymph node metastasis was **6.30**μ.

There was no significant correlation between Mmnd and Lymph node metastasis as shown in Table (32) & Figure (46).

Table (32): Correlation between Mmnd & lymph node metstasis

Lymph node	No	Mmnd	S.D
-ve	13	5.70μ	±0.95
+ve	20	6.30μ	±1.25
Total	33	6.07μ	±1.17

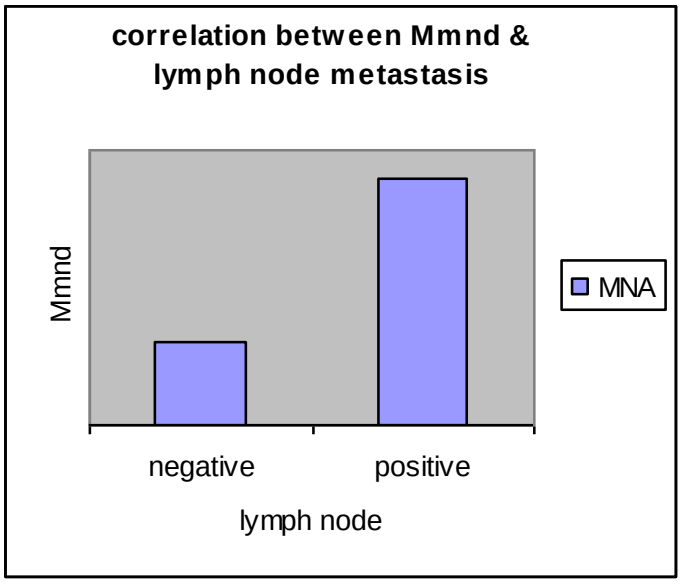


figure (46):Correlation between Mmnd & lymph node metstasis

Correlation between Mmnd & Distant metstasis :

The Mmnd of NPC cases in M0 was (**5.62**μ), while the Mmnd of NPC cases in M1 was (**6.84**μ). **There was a significant correlation between Mmnd and distant metastasis** ($p<0.05$) as shown in Table (33) & Figure (47).

Table (33) :Correlation between Mmnd & Distant metstasis

Metastasis	No	Mmnd	S.D
M0	21	5.62μ	±.88
M1	12	6.84μ	±1.23
Total	33	6.07μ	±1.17

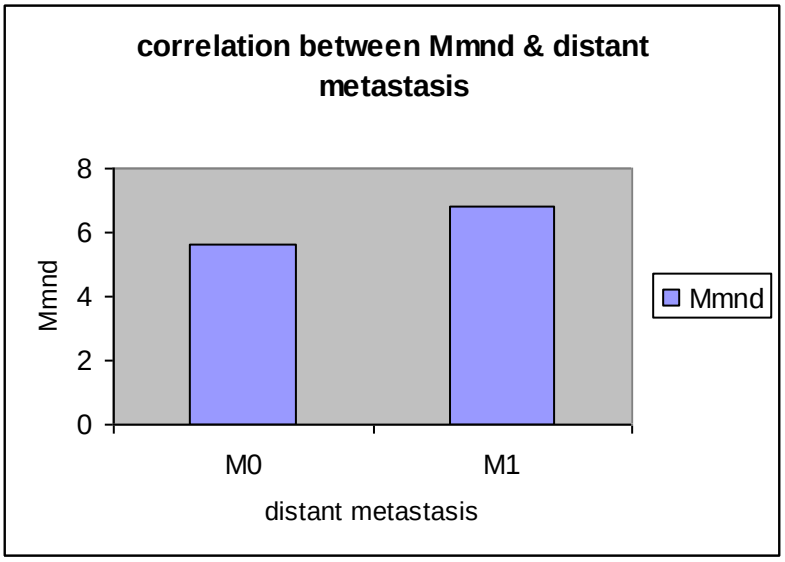


Figure (47): Correlation between Mmnd & Distant metstasis

Correlation between Mmnd & Tumor stage :

The Mmnd of NPC cases in stages I , II & III were (5.75µ , 5.32µ & 5.99µ respectively), while the Mmnd of NPC cases in stages IV was (6.84µ). **There was significant correlation between Mmnd and tumor stage** ($p< 0.05$) as shown in Table (34) & Figure (48) .

Table (34): Correlation between Mmnd & Tumor stage

TNM stage	No	Mmnd	S.D
Stage 1	7	5.75µ	±.82
Stage II	9	5.32µ	±1.07
Stage III	5	5.99µ	±.44
Stage IV	12	6.84µ	±1.23
Total	33	6.07µ	±1.17

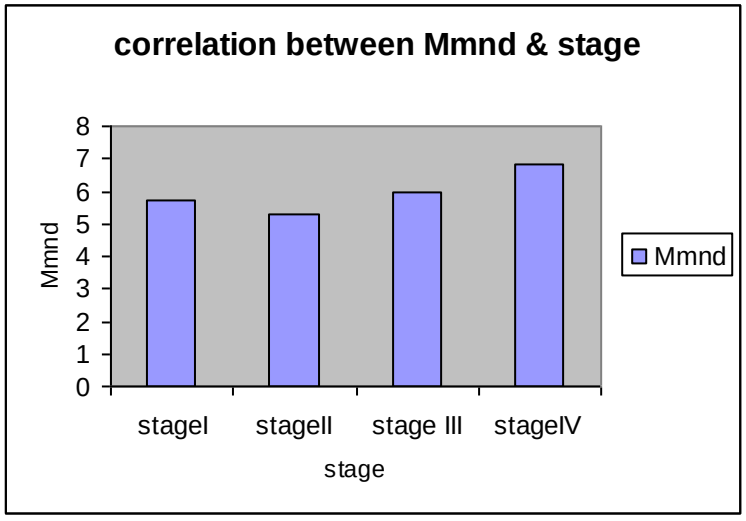


Figure (48): Correlation between Mmnd & Tumor stage

Correlation between Mmnd & 3 year survival

The Mmnd of free 3 year survival & recurrent cases was (5.50μ and 5.77μ respectively), while the Mmnd of dead cases was (6.62μ). **There was a significant correlation between Mmnd and 3 year survival** ($p<0.05$) as shown in Table (35) & Figure (49).

Table (35): Correlation between Mmnd & 3 year survival

3 years disease free survival	No	Mmnd	S.D
free	11	5.50μ	±1.02
Recurrent	7	5.77μ	±.76
Dead	15	6.62μ	±1.22
Recurrent/ dead	22	6.29μ	±1.21
Total	33	6.07μ	±1.17

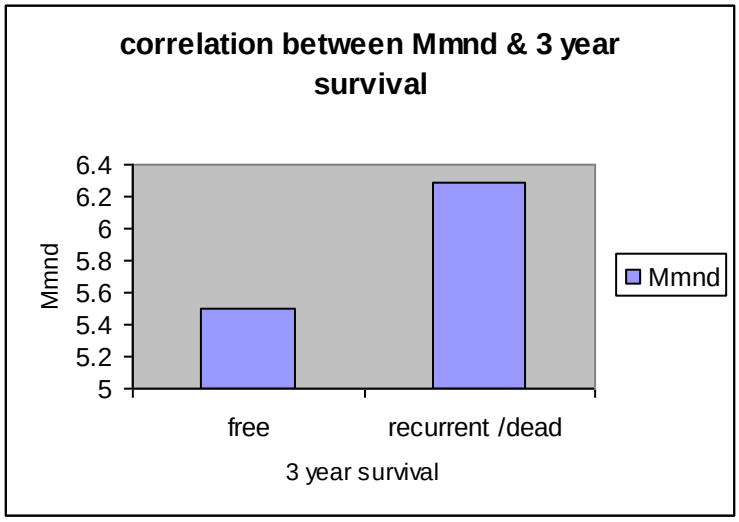


figure (49):Correlation between Mmnd & 3 year survival

Mean Maximum nuclear diameter (MMND):

MMND for normal cases was 7.03 μ and for malignant cases was 10.06μ ±1.66

Relation between MMND & histpathological type :

MMND for squamous cell carcinoma was 10.44μ while MMND for undifferentiated carcinoma was 9.89μ . **There was no significant correlation between MMND & histopathological type** as shown in Table (36) & Figure (50) .

Table (36): Relation between MMND & histpathological type

Type	No	Range	MMND	S.D
squamous cell carcinoma	10	8.7-12.4	10.44μ	± 1.41
Undifferentiated carcinoma	23	8.2-16.6	9.89μ	± 1.77
Total	33	8.2-16.6	10.06μ	±1.66

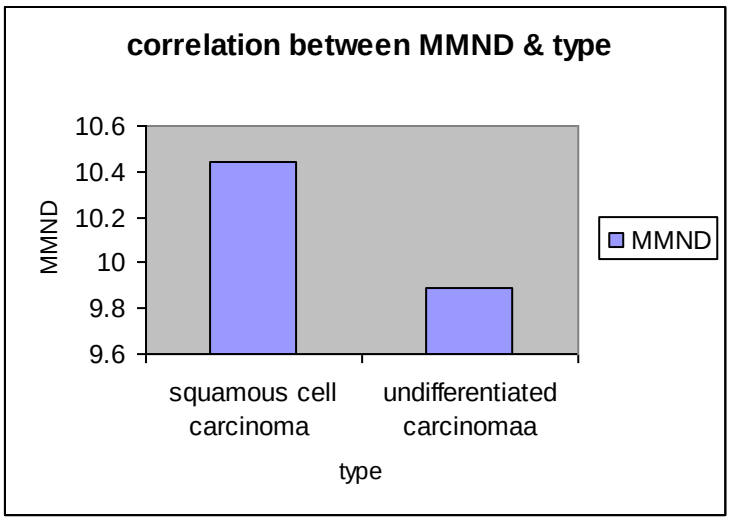


Figure (50): Relation between MMND & histpathological type

Correlation between MMND & grade:

MMND for well differentiated carcinoma was 11.08µ , MMND for moderately differentiated carcinoma was 10.36µ . MMND for poorly differentiated carcinoma was 9.73 µ . **There was no significant correlation between MMND & grade** as shown in Table (37) & Figure (51) .

Table (37): Correlation between MMND & grade

Grade	No	MMND	S.D
Well differentiated	2	11.08µ	± 1.95
Moderately differentiated	13	10.36µ	±2.25
Poorly differentiated	18	9.73µ	±1.06
Total	33	10.06µ	±1.66

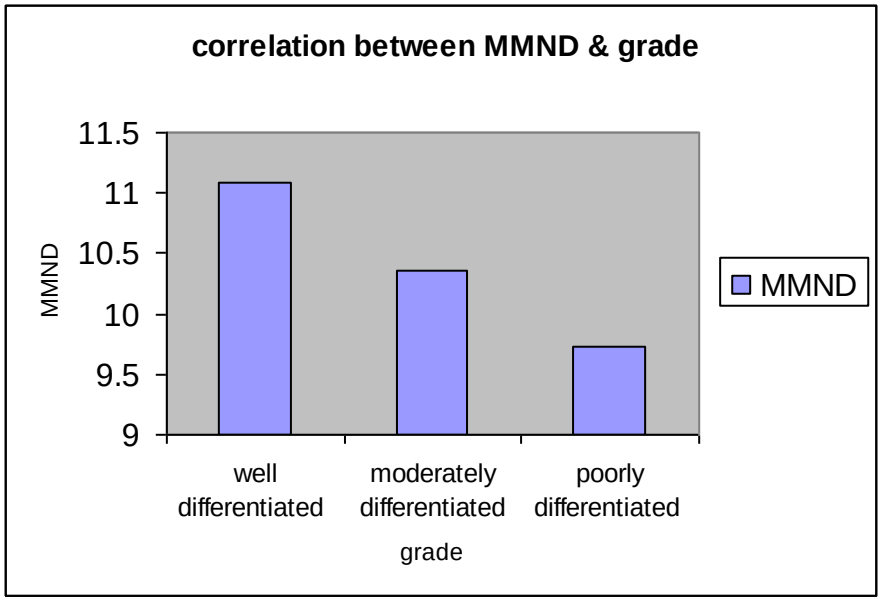


Figure (51): Correlation between MMND & grade

Correlation between MMND & T stage :

The MMND of NPC cases in T 1and T2 were (9.43µ and 9.39µ respectively), while the MMND of NPC cases in T3 and T4 were (10.72µ and 10.63µ respectively). **There was no significant correlation between MMND and T stage** as shown in Table (38) & Figure (52).

Table (38): Correlation between MMND & T stage

T stage	No	MMND	S.D
T1	7	9.43µ	±.67
T2	9	9.39µ	±.97
T3	7	10.72µ	±.38
T4	10	10.63µ	±1.53
Total	33	10.06µ	±1.66

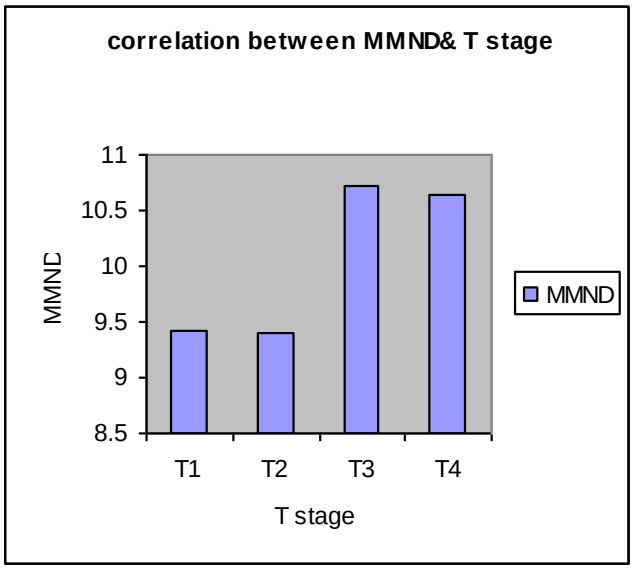


Figure (52): Correlation between MMND & T stage

Correlation between MMND & lymph node metstasis :

The MMND of NPC cases with negative lymph node metastasis was 9.45μ while the MMND of NPC cases with positive lymph node metastasis was 10.45μ **There was no significant correlation between MMND and Lymph node metastasis** as shown in Table (39) & Figure (53) .

Table (39): Correlation between MMND & lymph node metstasis

Lymph node	No	MMND	S.D
-ve	13	9.45μ	±0.64
+ve	20	10.45μ	±2.00
Total	33	10.06μ	±1.66

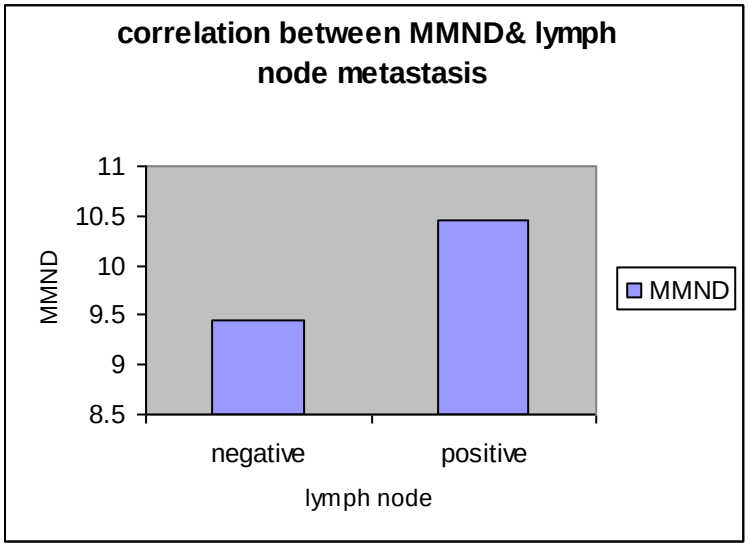


Figure (53): Correlation between MMND & lymph node metstasis

Correlation between MMND & Distant metstasis:

The MMND of NPC cases in M0 was (9.83μ), while the MMND of NPC cases in M1 was (10.46μ). **There was no significant correlation between MMND and distant metastasis** as shown in Table (40) & Figure (54).

Table (40) Correlation between MMND & Distant metstasis:

Metastasis	No	MMND	S.D
M0	21	9.83μ	±1.77
M1	12	10.46μ	±1.44
Total	33	10.06μ	±1.66

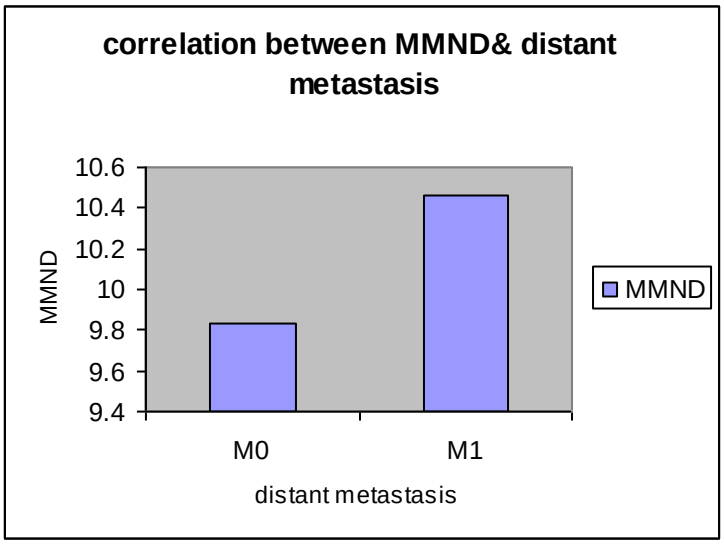


Figure (54): Correlation between MMND & Distant metstasis

Correlation between MMND & Tumor stage :

The MMND of NPC cases in stages I , II were (9.43µ , 9.39µ respectively), while the MMND of NPC cases in stages III & stage IV was (11.16µ and 10.46 µ respectively). **There was no significant correlation between MMND and tumor stage** as shown in Table (41) & Figure (55).

Table (41): Correlation between MMND & Tumor stage

TNM stage	No	MMND	S.D
Stage 1	7	9.43µ	±.67
Stage II	9	9.39µ	±.97
Stage III	5	11.16µ	±3.20
Stage IV	12	10.46µ	±10.46
Total	33	10.06µ	±1.66

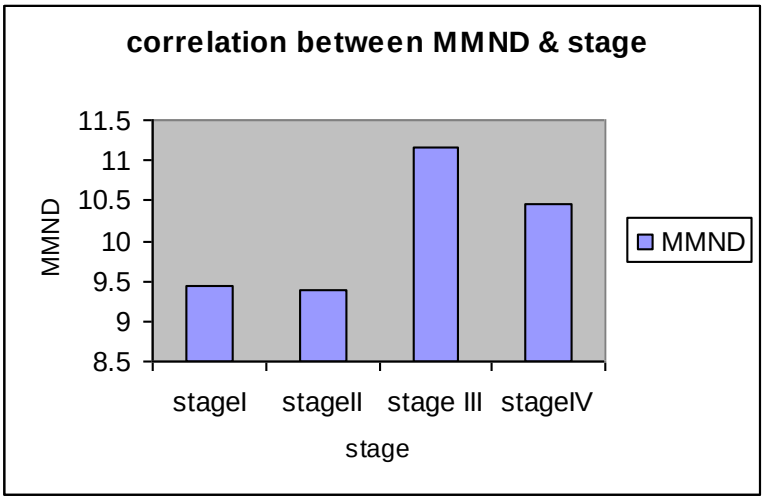


Figure (55): Correlation between MMND & Tumor stage

Correlation between MMND & 3 year survival

The MMND of free 3 years survival & recurrent cases was (9.17μ and 9.61μ respectively), while the MMND of dead cases was (10.92μ). **There was a significant correlation between MMND and 3 year survival** ($p<0.05$) as shown in Table (42) & Figure (56).

Table (42): Correlation between MMND & 3 year survival

3 years disease free survival	No	MMND	S.D
Free	11	9.17μ	±.49
Recurrent	7	9.61μ	±1.22
Dead	15	10.92μ	±2.01
Recurrent/dead	22	10.41μ	±1.87
Total	33	10.06μ	±1.66

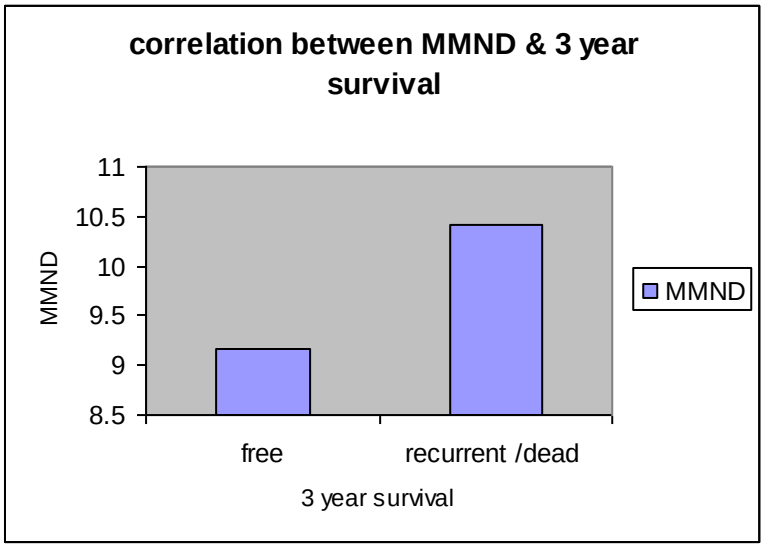


figure (56):Correlation between MMND & 3 year survival

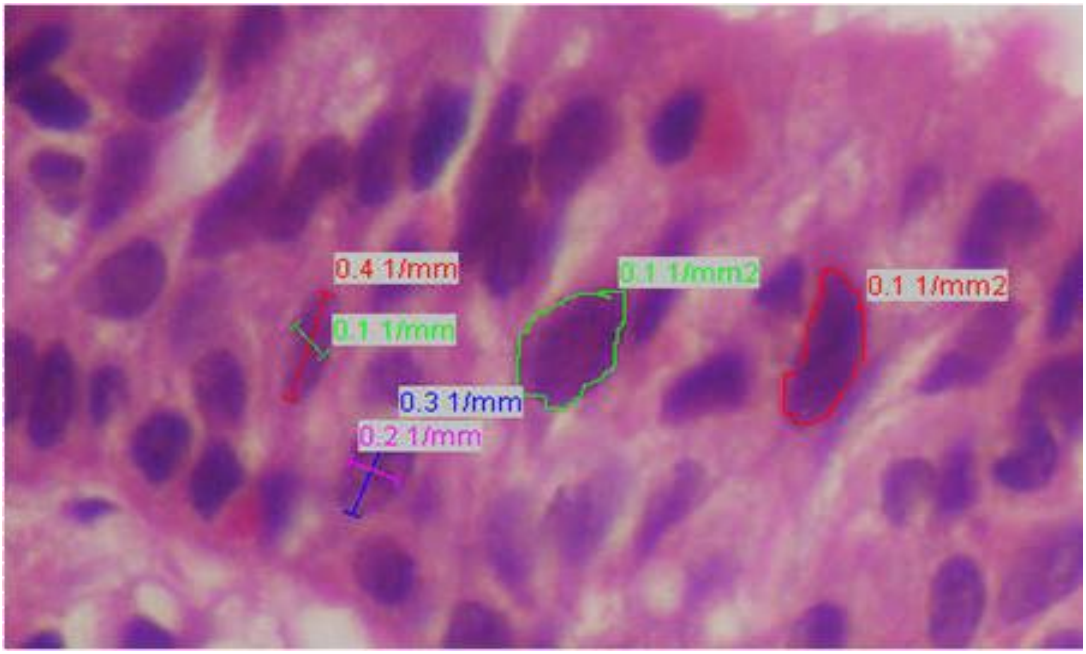


Figure (57): apparently Normal epithelial covering of the nasopharynx showing a) Min and Max diameters with the MNEF 0.46. b) Nuclear area with mean value of 20.5μ^2 (H&E x 400 with 400% zooming).

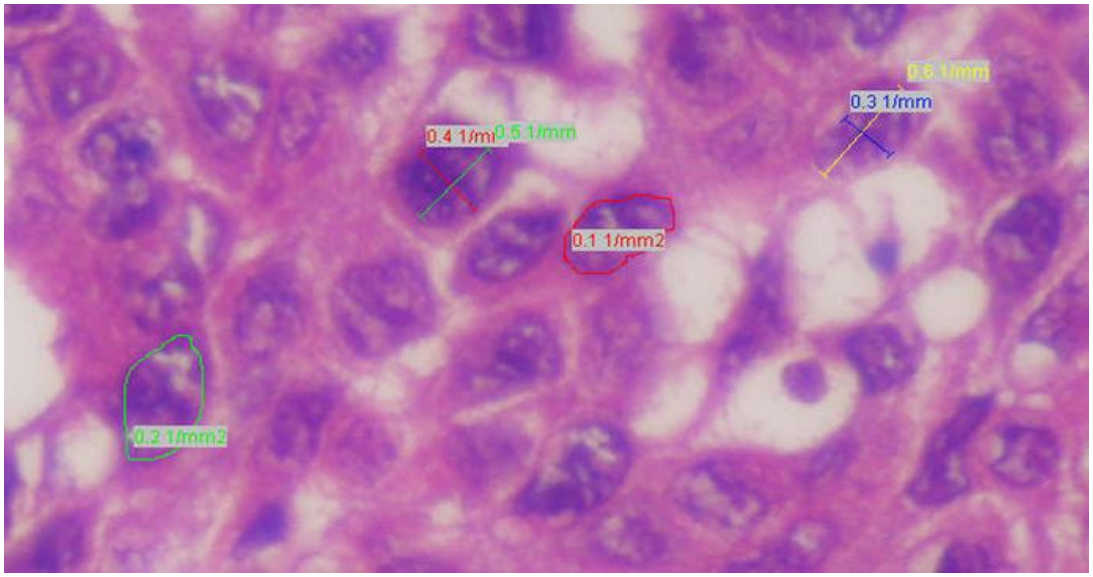


Figure (58): A case of well differentiated Squamous cell carcinoma showing: a) Min and Max diameters with the MNEF 0.61. b) Nuclear area with mean value of 49.5 μ^2 (H&E x 400 with 400% zooming).

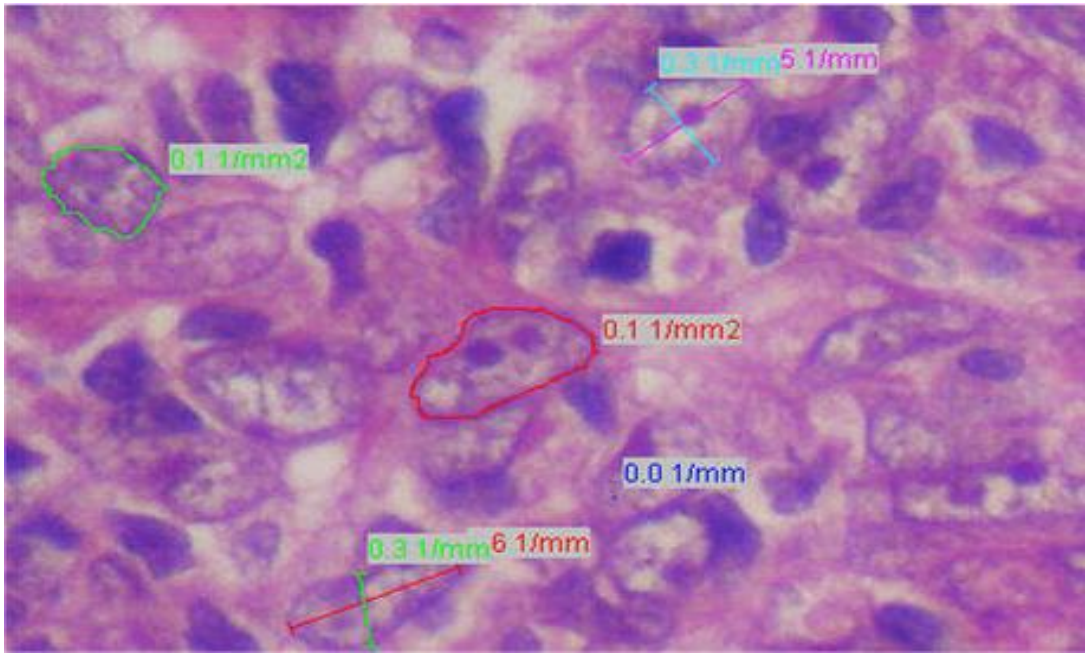


Figure (59): A case of undifferentiated carcinoma undifferentiated NPC showing: a) Min and Max diameters with the MNEF 0.65. b) Nuclear area with mean value of 70 μ^2 (H&E x 400 with 400% zooming).

2- Immunohistochemical results:

6 control cases were negative for survivin expression . Out of 33 cases of nasopharyngeal carcinoma , 18 cases were positive for survivin expression & 15 cases were negative**.**

The relation between type and survivin expression :

Out of 10 cases(30.3%) of squamous cell carcinoma , 3cases (30%) were -ve, 7 cases (70%) were +ve. .out of 23 cases(69.7%) of undifferentiated carcinoma , 12 cases (52.2%) were –ve , 11 cases (47.8 %) were +ve as shown in Table (43) & Figure (60) .

Table (43): The relation between type and survivin expression

Type	No. of cases	%	Survivin			
			-ve		+ve	
			No.	%	No.	%
Squamous cell carcinoma	10	30.3	3	30	7	70
Undifferentiated carcinoma	23	69.7	12	52.2	11	47.8
Total	33		15	45.5	18	54.5

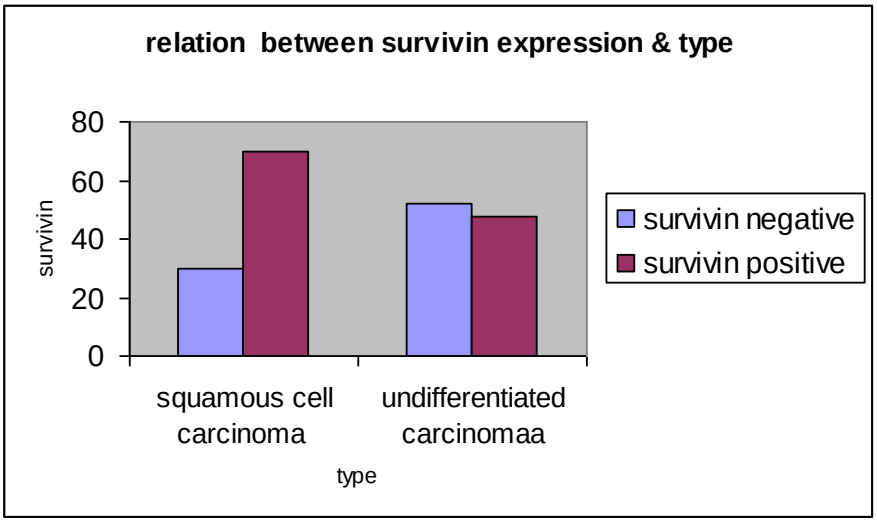


figure (60): The relation between type and survivin expression

Correlation between survivin expression and tumor grade :

All cases of well differentiated carcinoma were +ve for survivin .out of 13 cases (39.4%) of moderately differentiated carcinoma , 4 cases (30.7%) were negative for survivin & 9 cases (69.3%) were +ve .out of 18 cases (54.6%) of poorly differentiated carcinoma , 11 cases (61.2%) were negative , 7 cases (38.2%) were +ve .**There was significant correlation between grade & survivin expression** as shown in Table (44) & Figure (61) .

Table (44): Correlation between survivin expression and tumor grade

Grade	No. of cases	%	Survivin			
			-ve		+ve	
			No.	%	No.	%
Well differentiated	2	6	0	0	2	100
Moderately differentiated	13	39.4	6	46.2	7	53.8
Poorly differentiated	18	54.6	7	38.9	11	61.1
Total	33		15		18	

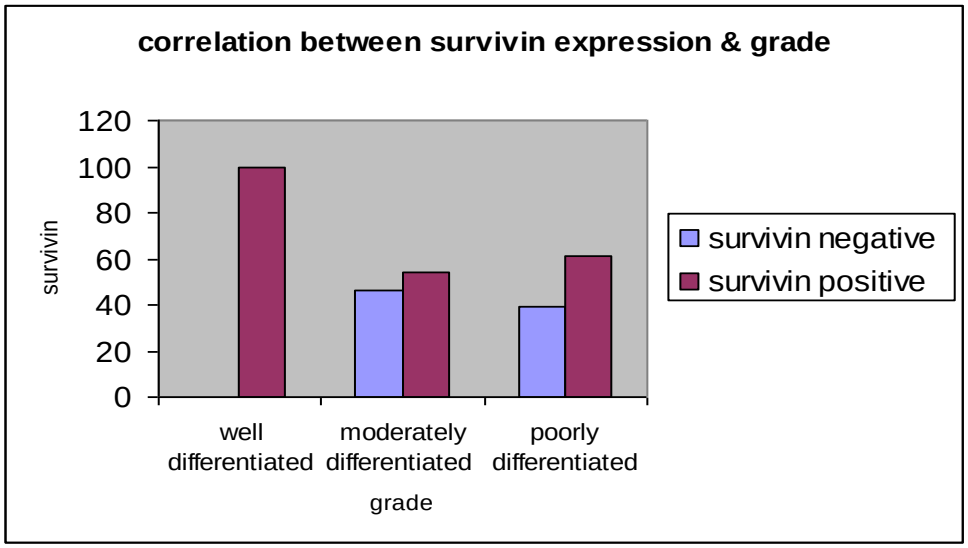


Figure (61): Correlation between survivin expression and tumor grade

Correlation between survivin expression and tumor size :

Out of 7 cases (21.2%) of T1, 6 cases (85.7%) were –ve for survivin , 1 cases (14.3%) was +ve. out of 8 cases (24.2%) of T2 , 5 cases (62.5 %) were –ve for survivin , 3 cases (37.5%) were +ve..out of 8 cases (24.2%) of T3 , 2 cases (25%) were –ve , 3 cases (70%) were +ve . out of 10 cases (30.4%) of T4 , 2 cases (20%)were -ve , 8 cases (80%) were +ve . **There was significant correlation between survivin expression & T stage** ($p<0.05$) as shown in Table (45) & Figure (62)**.** Cases with positive survivin expression had higher depth of invasion than cases with negative survivin expression.

Table (45) :Correlation between surviv in expression and T stage

T stage	No	%	Survivin			
			-ve		+ve	
			No	%	No	%
T1	7	21.2	6	85.7	1	14.3
T2	8	24.2	5	62.5	3	37.5
T3	8	24.2	2	25	6	75
T4	10	30.4	2	20	8	80
Total	33		15	45.5	18	54.5

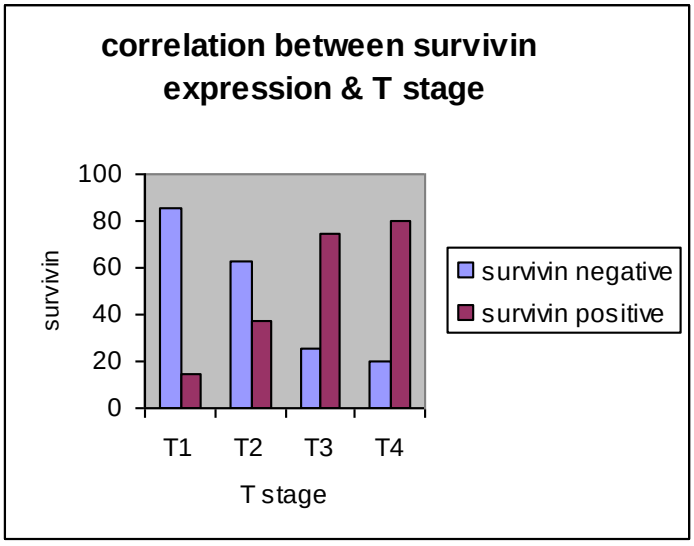


figure (62) :Correlation between survivin expression and T stage

Correlation between survivin expression & lymph node metastasis:

Out of 13 cases (39.4%) of –ve lymph node metastasis, 9 cases (69.3%)were –ve for survivin , 4 cases (30.7%) were +ve for survivin . out of 20 cases (60.6%) of +ve lymph node metastasis , 6 cases (30%) were –ve for survivin , 14 cases (70%) were +ve for survivin . **There was a significant correlation between survivin & lymph node metastasis**($p<0.05$) as shown in Table (46) & Figure (63) . Cases with positive survivin expression had +ve lymph node metastasis than cases with negative survivin expression .

Table (46): Correlation between survivin expression & lymph node metastais

Lymph node	No. of cases	%	Survivin			
			-ve		+ve	
			No.	%	No.	%
-ve	13	39.4	9	69.3	4	30.7
+ve	20	60.6	6	30	14	70
Total	33		15	45.5	18	54.5

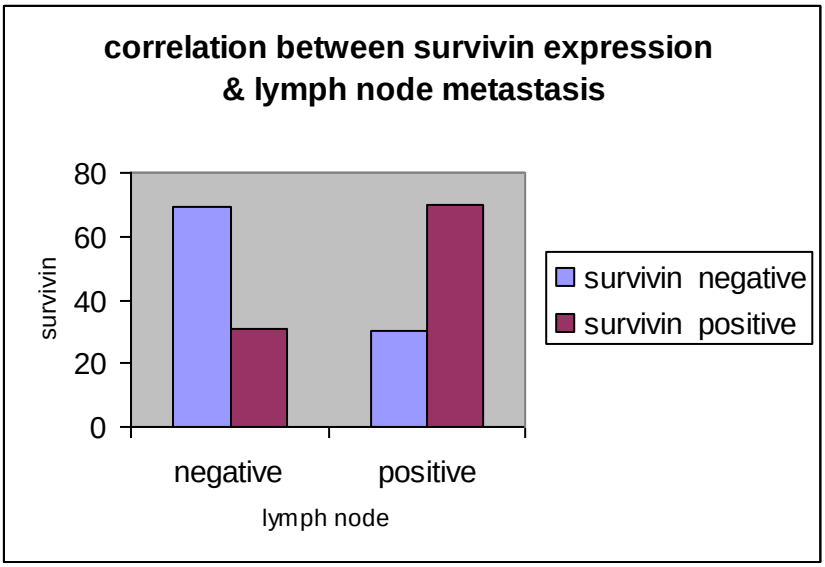


Figure (63): Correlation between survivin expression & lymph node metastais

Correlation between survivin expression and distant metastasis :

Out of 21 cases (63.6%) of M0 , 12 cases (57.1 %) were –ve for survivin , 9 cases (42.9%) were +ve . out of 12 cases (36.4%) of M1 , 3 cases (25%) were -ve , 9 cases (75%) were +ve . **There was no significant correlation between survivin expression & distant metastasis** as shown in Table (47) & Figure (64).

Table (47): Correlation between survivin expression and distant metastasis

Metastasis	No. of cases	%	Survivin			
			-ve		+ve	
			No.	%	No.	%
M0	21	63.6	12	57.1	9	42.9
M1	12	36.4	3	25	9	75
Total	33		15	45.5	18	54.5

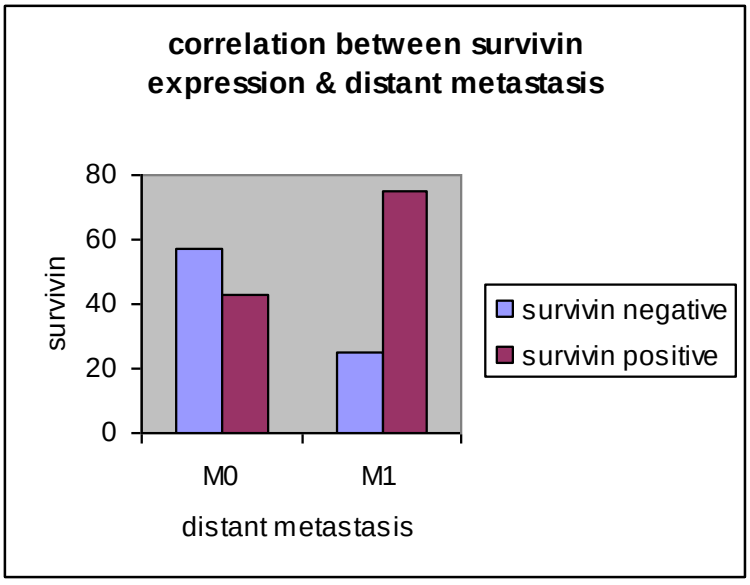


Figure (64): Correlation between survivin expression and distant metastasis

Correlation between survivin expression and Tumor stage :

Out of 7 cases (21.2%) of stage I , 6 cases (85.7%) were –ve for survivin , 1 cases (14.3%) was +ve for survivin . out of 9 cases (27.3%) of stage II , 6 cases (66.7 %) were –ve for survivin , 3 cases (33.3%) were +ve for survivin .out of 5 cases (15.2%) of stage III , 1case (20 %) were –ve , 4 cases (80%) were +ve . out of 12cases (36.3%) of stage IV , 2cases (16.7%) were –ve , 10 cases (83.3%) were +ve **There was significant correlation between survivin expression & stage (p<0.05)** as shown in Table (48) & Figure (65) . cases with positive survivin expression had advanced stage than cases with negative survivin expression.

Table (48): Correlation between survivin expression and Tumor stage

TNM stage	No	%	Survivin			
			-ve		+ve	
			No	%	No	%
Stage I	7	21.2	6	85.7	1	14.3
stageII	9	27.3	6	66.7	3	33.3
stageIII	5	15.2	1	20	4	80
stageIV	12	36.3	2	16.7	10	83.3
Total	33		15	45.5	18	54.5

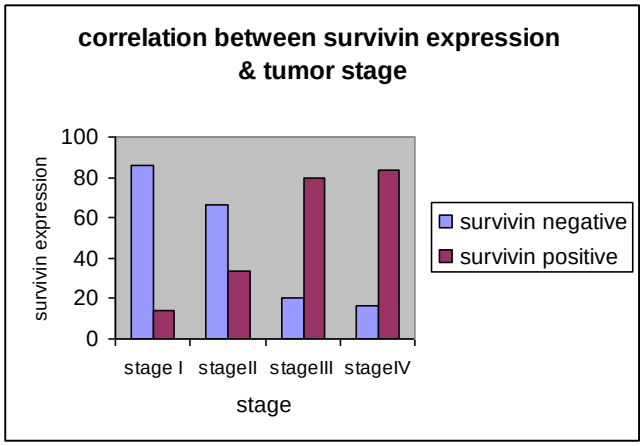


Figure (65): Correlation between survivin expression and Tumor stage

Correlation between survivin expression and 3 year survival :

Out of 12 cases(36.4%) of free 3 year survival , 9 cases (75%) were –ve for survivin expression , 3 cases (25%) were +ve . out of 9 cases (27.2%) recurrent cases , 4 cases (44.4%) were –ve , 5 cases (55.6%) were +ve .out of 12 cases (36.4%) were dead cases , 2 cases (16.7%) were –ve , 10 cases (83.3%) were +ve **There was significant correlation between survivin expression & 3 year survival**($p < 0.05$) as shown in Table (49) & Figure (66) .cases with positive survivin expression had short 3 year survival than cases with negative survivin expression.

Table (49): Correlation between survivin expression and 3 year survival

3 year survival	No. of cases	%	Survivin			
			-ve		+ve	
			No.	%	No.	%
Free	12	36.4	9	75	3	25
Recurrent	9	27.2	4	44.4	5	55.6
dead	12	36.4	2	16.7	10	83.3
Recurrent /dead	21	63.6	6	28.6	15	71.4
Total	33		15	45.5	18	54.5

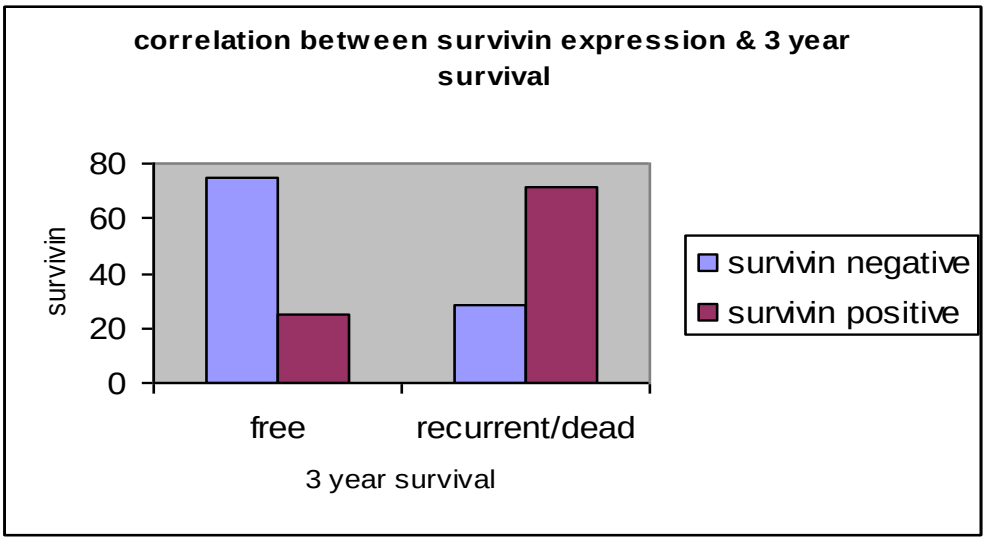


Figure (66): Correlation between survivin expression and 3 year survival

Correlation between survivin expression and MNA :

MNA for -ve survivin expression was 37.88 μ, MNA for +ve survivin expression was 52.81μ **.There was significant correlation between MNA & survivin expression** (p>0.05) as shown in Table (50) & Figure (67).

Table (50): Correlation between survivin exprssion and MNA

Survivin	No	MNA	S.D
-ve	15	37.88μ	±6.57
+ve	18	52.81μ	±13.78
Total	33	46.02μ	±13.30

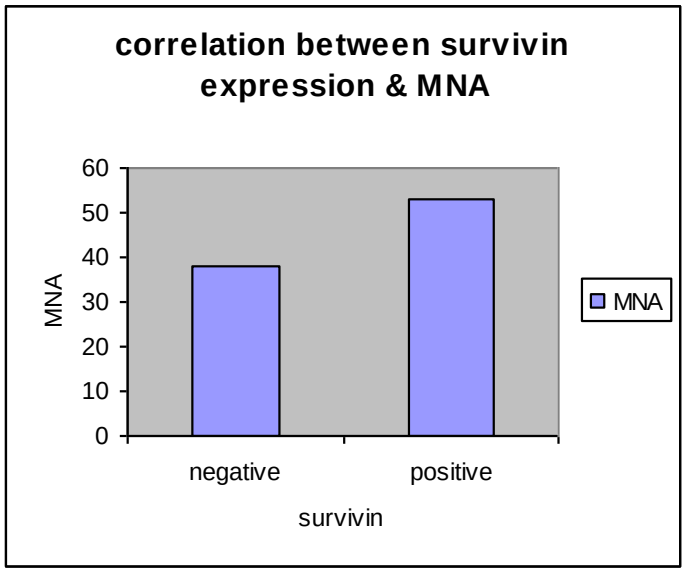


Figure (67): Correlation between survivin exprssion and MNA

Correlation between Survivin expression & Mmnd:

The Mmnd of NPC cases with –ve survivin expression was (5.55µ), while the Mmnd of NPC cases with +ve survivin expression was (6.50µ). **There was a significant correlation between Mmnd and survivin expression** ($p<0.05$) as shown in Table (51) & Figure (68).

Table (51): Correlation between Survivin expression & Mmnd

survivin	No	Mmnd	S.D
-ve	15	5.55µ	±.99
+ve	18	6.50µ	±1.15
Total	33	6.07µ	±1.17

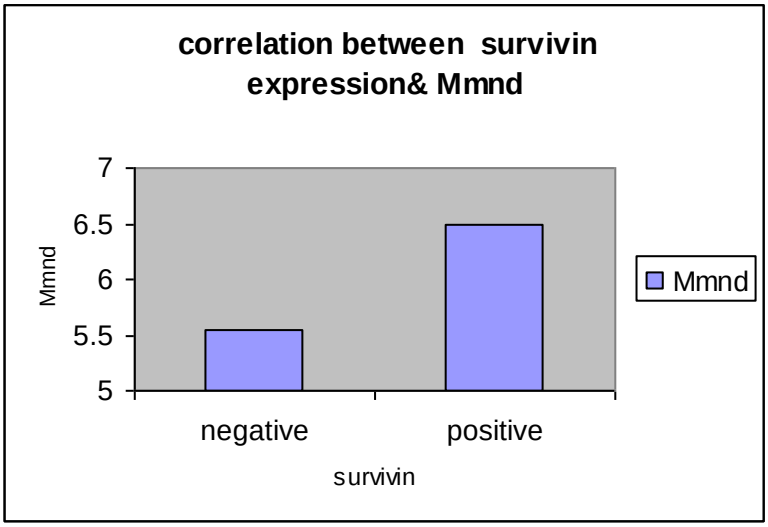


Figure (68): Correlation between Survivin expression & Mmnd

Correlation between Survivin expression & MMND :

The MMND of NPC cases with –ve survivin expression was 9.36μ, while the MMND of NPC cases with +ve survivin expression was 10.64μ. . **There was a significant correlation between MMND and survivin expression** ($p<0.05$) as shown in Table (52) & Figure (69).

Table (52): Correlation between Survivin expression & MMND

survivin	No	MMND	S.D
-ve	15	9.36μ	±.91
+ve	18	10.64μ	±1.94
Total	33	10.06μ	±1.66

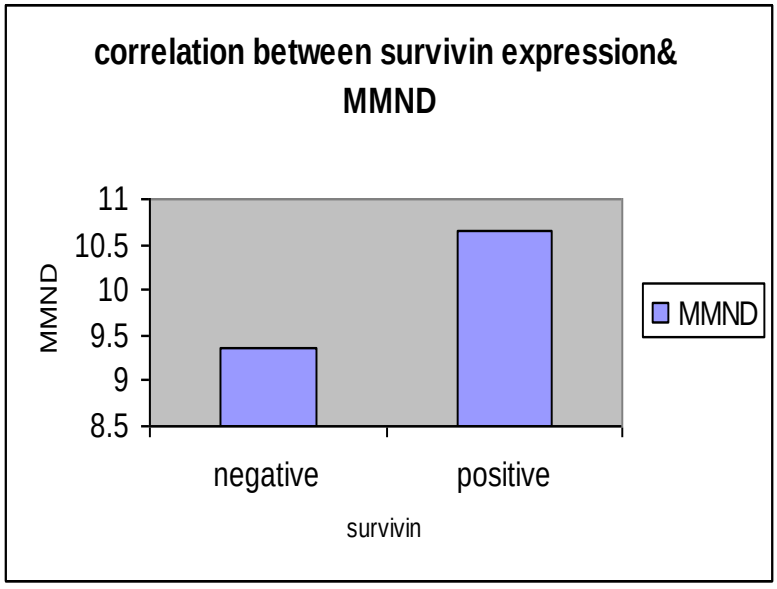


figure (69): Correlation between Survivin expression & MMND

Correlation between MNEF and survivin expression:

MNEF for –ve expression was 0.59µ while MNEF for +ve expression was 0.61µ.. **There was no significant correlation between MNEF & survivin expression** as shown in Table (53) & Figure (70).

Table (53): Correlation between survivin expression and MNEF

Survivin	No	MNEF	S.D
-ve	15	0.59µ	±.52
+ve	18	0.61µ	±.49
Total	33	0.60µ	±.50

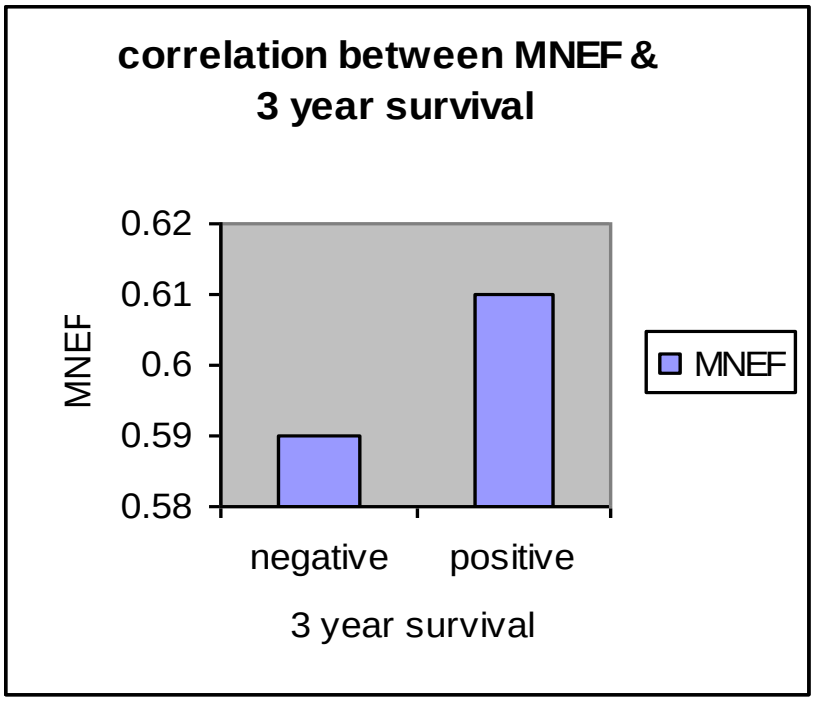


Figure (70): Correlation between survivin expression and MNEF

Table (54) :Correlation between survivin expression , morphometric parameters and different clinicopathological variants

clinicopathological variant		Survivin		P value	3 years survival	MNA	P value
		-ve	+ve				
T stage	T1	85.7	14.3	*P<0.05	Significant P<0.05	35.15	P<0.05
	T2	62.5	37.5			38.73	
	T3	25	75			52.20	
	T4	20	80			55.87	
Lymph node	-ve	69.3	30.7	P<0.05	Significant P<0.05	39.0	P<0.05
	+ve	30	70			50.58	
Metastasis	-ve	57.1	42.9	Non Significant	Non Significant	41.01	P<0.05
	+ve	25	75			54.79	
Stage	I	85.7	14.3	P<0.05	Significant P<0.05	35.15	P<0.05
	II	62.5	37.5			38.73	
	III	20	80			53.34	
	IV	23	77			54.79	
3 years free survival	free	75	25	P<0.05		40.92	P<0.05
	Recurrent/dead	28.6	71.4			48.94	
Grade	WDT	33.3	66.7	Non Significant	Non Significant	51.80	Non Significant
	MDT	30.7	69.3			47.18	
	PDT	58.8	41.2			44.55	
MNA		37.88	52.81	P<0.05	Significant		
Mmnd		5.55	6.50	P<0.05	Significant		
MMND		9.36	10.64	P<0.05	Significant		
MNEF				Non Significant	Non Significant		

Histopathological variant		Mmnd	P value	MMND	P value	MNEF	P value
Tumor size	T1	5.75	Significant P<0.05	9.43	Non Significant	0.60	Non Significant
	T2	5.32		9.39		0.57	
	T3	6.02		10.72		0.57	
	T4	6.99		10.63		0.64	
Lymph node	-ve	5.70	Non Significant	9.45	Non Significant	0.60	Non Significant
	+ve	6.30		10.45		0.60	
Metastasis	-ve	5.62	P<0.05	9.83	Non Significant	0.57	Non Significant
	+ve	6.84		10.46		0.64	
Stage	I	85.7	P<0.05	9.43	Non Significant	0.60	Non Significant
	II	62.5		9.39		0.56	
	III	20		11.16		0.55	
	IV	23		10.46		0.64	
3 years free survival	free	5.50	P<0.05	9.17	P<0.05	0.59	Non Significant
	Recurrent/dead	6.62		10.92		0.60	
Grade	WDT	6.87	Non Significant	11.08	Non Significant	0.61	Non Significant
	MDT	6.04		10.36		0.58	
	PDT	5.99		9.73		0.61	

Significant ($p<0.05$)

Figure (71): Apperantly Normal epithelial covering of the nasopharynx showing negative survivin expression (APC X400)

Figure (72):Well differentiated squamous cell carcinoma showing cytoplasmic survivin expression (x1000 oil immersion lens)

Figure (73): Nonkeratinizing undifferentiated NPC showing nuclear survivin expression (APC X400)

Figure (74): Nonkeratinizing undifferentiated NPC showing nuclear survivin expression (APC X400)

Figure (75): Nonkeratinzing undifferentiated showing nuclear survivin expression (x1000 oil immersion lens)

Figure (76): Nonkeratinzing undifferentiated showing nuclear survivin expression (x1000 oil immersion lens)

Fig (77):Nonkeratinzing undifferentiated showing nuclear& cytoplasmic survivin expression (x1000 oil immersion lens)

Fig(78):Nonkeratinzing undifferentiated showing nuclear survivin expression (x1000 oil immersion lens)