RESULTS

The present study was conducted on 120 normal males and females from Qalubia governorate, their ages ranged from (1 to 20 years). They were divided into three groups. The age of first group ranged from (1 to < 6 years) and their number were 40 (20 males and 20 females). The age of second group ranged from (6 to < 12 years) and their number were 40 (20 males and 20 females) . The age of third group ranged from (12 -20 years) and their number were 40 (20 males and 20 females).

The relationship between the different variables and ages of the studied groups (Table 1):

Portal vein diameter:

In the first group (1< 6 years) the mean diameter of portal vein was (0.6 $\pm$ 0.1 cm) ranged from (0.52 - 0.76 cm) (Fig:18, 19) . In the second group (6 < 12 years) , the mean diameter of portal vein was about (0.79 ± 0.02 cm) ranged from (0.76 – 0.83 cm) (Fig:20, 21) . In the third group (12-20 years) , the mean diameter of portal vein was about(0.9 ± 0.06 cm) ranged from (0.84 - 1.1 cm) (Fig: 22, 23).

The rate of growth of portal vein diameter was maximal in the first group as it was 0.05 cm/ year, while in the second group, there was deceleration of this rate, it became 0.01 cm/ year . The rate of growth started to increase again to reach 0.03 cm/ year in the third group. (Tab. 1) , (Fig. 6) .

Common bile duct diameter:

In the first group, the mean diameter of common bile duct was about (0.2 ± 0.04 cm) ranged from (0.12 -0.24 cm) (Fig:18, 19). In the second group, the mean diameter of common bile duct was about (0.28 ± 0.02 cm) ranged from (0.25 -0.30 cm) (Fig: 20, 21). In the third group, the mean diameter of common bile duct was about (0.38 ± 0.04 cm) ranged from (0.3 - 0.44 cm) (Fig: 22, 23)

The rate of growth of common bile duct diameter in the first group was 0.02 cm / year. In the second group , this rate was decreased, as the annual increment was 0.01 cm / year .Then it returned to increase again to reach 0.02 cm / year at the age (12 -20 years). (Tab. 1) , (Fig. 7) .

The length of spleen:

In the first group, the mean length of spleen was about 7.3 ± 0.8 cm ranged from (6.2 -8.2 cm) (Fig: 24). In the second group, the mean length of spleen was about (8.9 ± 0.4 cm) ranged from (8.3 -9.5 cm) (Fig: 25) In the third group, the mean length of spleen was about (10.3 ± 0.6 cm) ranged from (9.4 -11.6 cm) (Fig: 26) .

The rate of growth of the splenic length showed its maximal value during the first six years of life , as it was 0.4 cm/ year ,but this rate was decreased , as the annual increment was 0.2 cm/ year in the second group (6 < 12 years). Then it returned to increase again to reach 0.3 cm/ year in the third group (12-20 years) (Tab. 1) , (Fig. 8).

The length of right lobe of the liver:

In the first group (1<6 years) , the mean length of right lobe was about (7.4 ± 0.7 cm) ranged from (6.1-8.4 cm) (Fig: 27) . In the second group (6<12 years), the mean length of right lobe was about (10.1 ± 0.4 cm) ranged from (9.2 -10.9 cm) (Fig: 28) . In the third group (12-20 years), the mean length of right lobe was about (11.9 ± 0.5 cm) ranged from (10.9 -12.7 cm) (Fig: 29).

The rate of growth of the right lobe of the liver showed its maximal value during the first six years of life , it was 0.5 cm/ year, but this rate was decreased, as the annual increment was 0.3 cm / year in the second group (6 < 12 years). It continued to decrease to reach 0.2 cm/ year in the third group (12-20 years) (Tab. 1), (Fig. 9).

The length of left lobe of the liver:

In the first group (1<6 years), the mean length of left lobe was about (5.7 ± 0.6 cm) ranged from(4.8 -6.8 cm) (Fig: 30). In the second group (6<12 years), the mean length of left lobe was about (7.5 ± 0.3 cm) ranged from (6.9 -8 cm) (Fig: 31). In the third group (12-20 years), the mean length of left lobe was about (8.7 ± 0.4 cm) ranged from (8 - 9.3 cm) (Fig: 32).

The rate of growth of the left lobe of the liver showed its maximal value during the first six years of life, it was 0.4 cm/ year,

but this rate was decreased , as the annual increment was 0.2 cm/ year in the second group (6 < 12 years) and also in the third group (12-20 years) . (Tab. 1) , (Fig. 10).

Correlation coefficient factor (r) between portal vein diameter and age, height and weight among the studied groups: (Tab. 2) (Fig. 11).

The portal vein diameter showed positive significant correlation with height, weight and age. It showed high positive correlation with height with correlation coefficient factor (r.) was 0.9475 and probability of error (p.) was <0.001**.** Then it was correlated with other parameters in the following order (weight and age).

Correlation coefficient factor (r) between common bile duct diameter and age, height and weight among the studied groups: (Tab. 3) (Fig. 12).

The common bile duct diameter showed positive significant correlation with height, weight and age It showed high positive correlation with age with correlation coefficient factor (r.) was 0.9765 and probability of error (p.) was <0.001. Then it was correlated with other parameters in the following order (height and weight).

Correlation coefficient factor (r) between lengths of spleen , right and left lobes of the liver and the height of the studied groups : (Tab. 1 , 4)

In the first group (1<6 years) , the mean body height was about (92.4 ± 11.8 cm) ranged from (75-109 cm), when we correlate the mean body height of this group with the splenic length (7.3 ± 0.8 cm) , length of right lobe of the liver (7.4 ± 0.7 cm) and length of left lobe of the liver (5.7 ± 0.6 cm) , the results showed positive significant correlation (P < 0.001).

In the second group (6 < 12 years) , the mean body height was about (125±8.2 cm) ranged from (112-139 cm) , when correlate the mean body height of this group with the splenic length (8.9 ± 0.4 cm) , length of right lobe of the liver (10.1 ± 0.4 cm) and length of left lobe of the liver (7.5 ± 0.3 cm), the results showed positive significant correlation (P <0.001).

In the third group (12-20 years), the mean body height was about (159.7 ± 11.9 cm) ranged from (140-178 cm). When correlate the mean body height of this group with the splenic length (10.3 ± 0.6 cm, length of right lobe of the liver (11.9 ± 0.5 cm) and length of left lobe of the liver (8.7 ± 0.4 cm) , statistically this correlation was significant (P < 0.001).

Correlation coefficient factor (r) between the lengths of spleen , right and left lobes of the liver and the weight of the studied groups : (Tab. 1 , 5)

In the first group (1<6 years), the mean body weight was about (14.6±3.8 kg) ranged from (10.5-20.5 kg). Statistically, when we correlate the mean body weight of this group with the splenic length (7.3 ±0.8 cm) , length of right lobe of the liver (7.4±0.7 cm) and length of left lobe (5.7±0.6 cm), the results showed positive significant correlation ($P < 0.001$).

In the second group (6<12 years) , the mean body weight was about (29.3± 5.5 kg) ranged from (21-39 kg), when we correlate the mean body weight of this group with the splenic length (8.9 ±0.4 cm), length of right lobe of the liver (10.1±0.4 cm) and length of left lobe (7.5±0.3 cm), statistically this correlation was significant ($P < 0.001$).

In the third group (12-20 years), the mean body weight was about (52± 8.9 kg) ranged from (38-69 kg), when correlate the mean body weight of this group with the splenic length (10.3 ±0.6 cm) , length of right lobe of the liver (11.9±0.5 cm) and length of left lobe (8.7 ± 0.4 cm), statistically this correlation was significant ($P < 0.001$).

The relation between the portal vein and common bile duct diameters and the sex of the studied groups:

The portal vein diameter showed no significant difference between males and females in all age groups ($P > 0.05$) **(Tab. 6) (Fig. 13).**

The common bile duct diameter showed no significant difference between males and females in all age groups ($P > 0.05$**) (Tab. 7) (Fig. 14).**

The relation between lengths of spleen , right and left lobes of the liver and the sex of the studied groups:

The splenic length showed no significant difference between males and females ($P > 0.05$). **(Tab. 8) (Fig. 15) .**

The length of right and left lobes of the liver showed no significant difference between males and females ($P > 0.05$). **(Tab. 9 , 10) (Fig. 16, 17) .**

- From the body height of the person we can calculate the diameter of portal vein (PV) by using this regression equation :

PV diameter (cm.) = Height x 0.004 + 0.3

- From the age of the person we can calculate the diameter of common bile duct (CBD) by using this regression equation :

CBD diameter (cm.) = Age x 0.02 + 0.1

Table (1) :parameters of all age groups

Age \ Variables		Body weight (kg)	Body height (cm)	Diameter of portal vein (cm)	Diameter of common bile duct (cm)	Splenic length (cm)	Length of Rt lobe of liver (cm)	Length of Lt lobe of liver (cm)
1st group 1 < 6 years	**Range**	10.5– 20.5	75- 109	0.52 -0.76	0.12 -0.24	6.2 -8.2	6.1 -8.4	4.8 – 6.8
	($\overline{X}$) ± SD	14.6 ± 3.8	92.4 ± 11.8	0.6 ± 0.1	0.2 ± 0.04	7.3 ± 0.8	7.4 ± 0.7	5.7 ± 0.6
	Annual increment/ year	2	6.8	0.05	0.02	0.4	0.5	0.4
2nd group 6 < 12 years	**Range**	21 – 39	112-139	0.76 - 0.83	0.25 - 0.30	8.3 -9.5	9.2- 10.9	6.9 –8
	($\overline{X}$)± SD	29.3 ± 5.5	125 ± 8.2	0.79 ± 0.02	0.28 ± 0.02	8.9 ± 0.4	10.1 ± 0.4	7.5 ± 0.3
	Annual increment / year	3	4.5	0.01	0.01	0.2	0.3	0.2
3rd group 12-20 years	**Range**	38 – 69	140 -178	0.84 -1.1	0.3 -0.44	9.4 - 11.6	10.9 -12.7	8 – 9.3
	($\overline{X}$)± SD	52 ± 8.9	159.7 ± 11.9	0.9 ± 0.06	0.38 ± 0.04	10.3 ± 0.6	11.9 ± 0.5	8.7 ± 0.4
	Annual increment / year	3.9	4.8	0.03	0.02	0.3	0.2	0.2

$$\text{Annual increment} = \frac{\text{Range}}{\text{(n) of years}} \qquad n = \text{number}$$

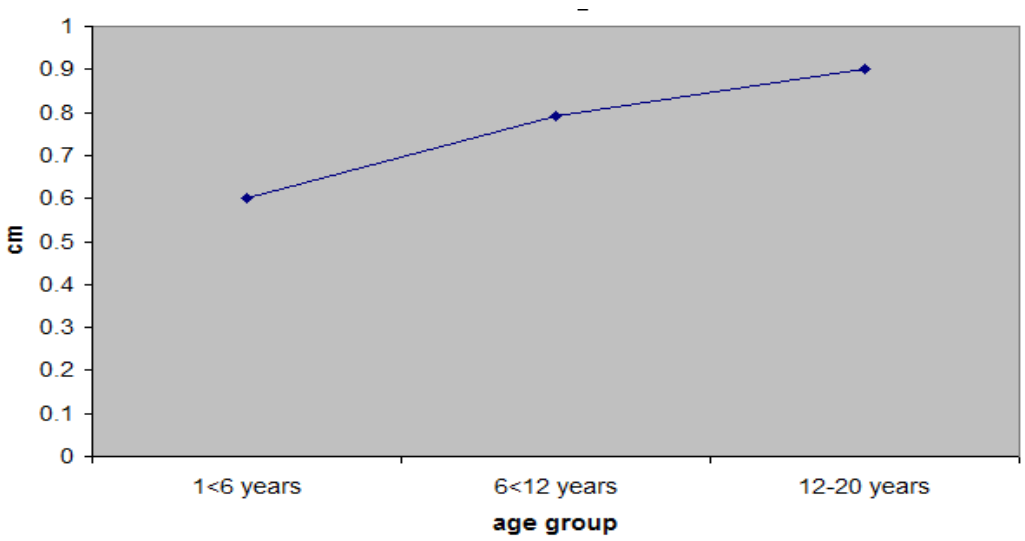

Fig. (6) : The mean diameter of portal vein of all cases of the studied groups according to age .

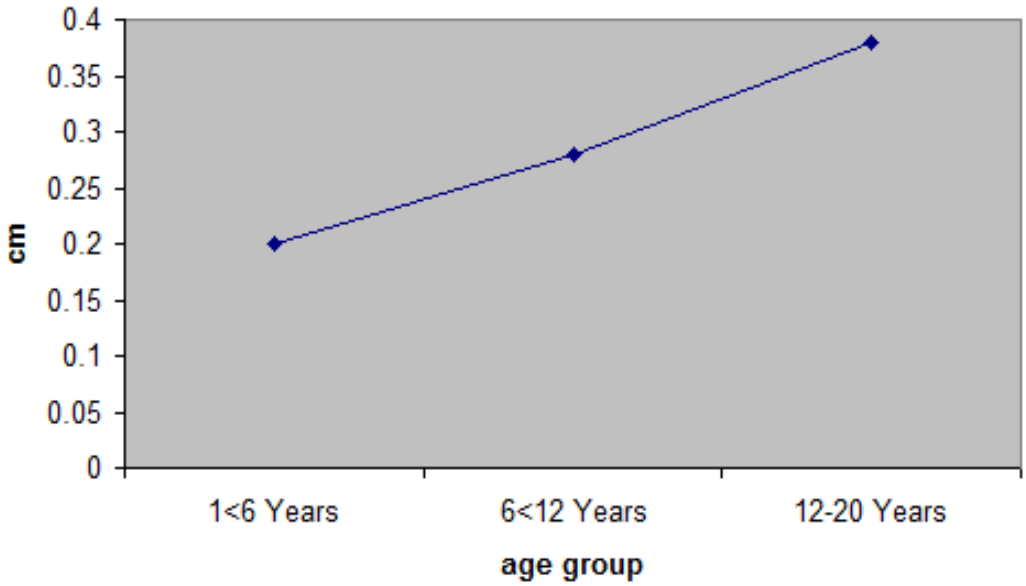

Fig.(7) : The Mean diameter of common bile duct of All cases of the studied groups according to age.

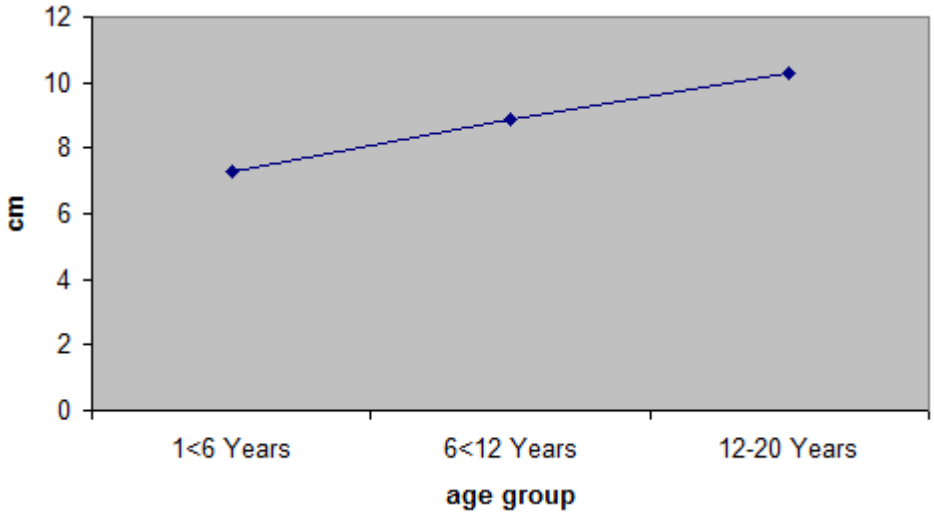

Fig. (8) : The mean length of spleen of all cases of the studied groups according to age .

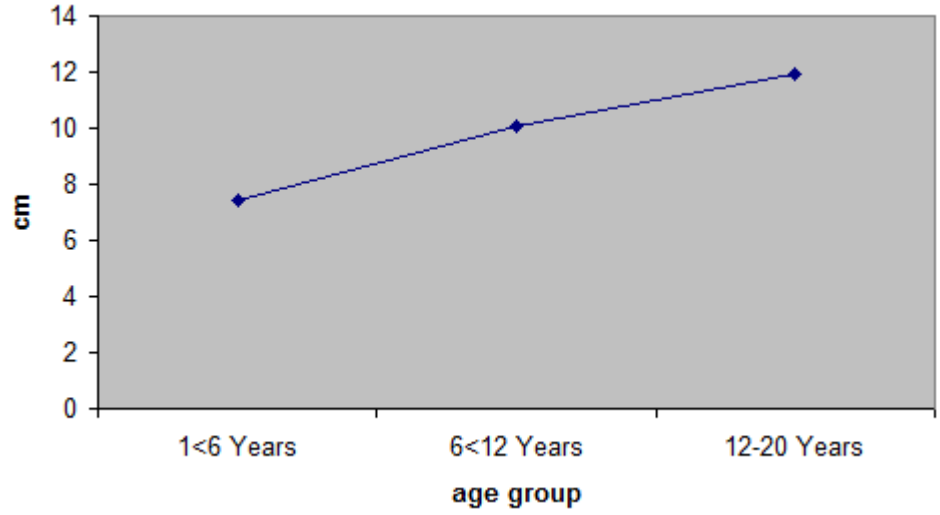

Fig. (9) : The mean length of right lobe of liver of all cases of the studied groups according to age.

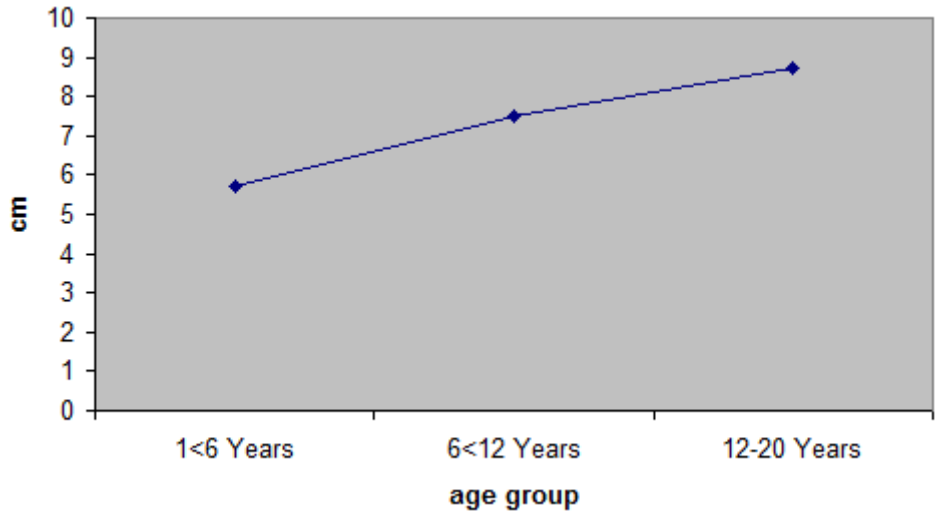

Fig. (10) : The mean lenght of left lobe of liver of all cases of the studied groups according to age.

Table (2) : Correlation coefficient factor (r) between portal vein diameter and age, height (Ht) and weight (Wt).

Portal vein diameter / Variable	Correlation coefficient (r)	P
Ht	0.9475	< 0.001
Wt	0.8756	< 0.001
Age	0.7998	< 0.001

P < 0.001= highly significant

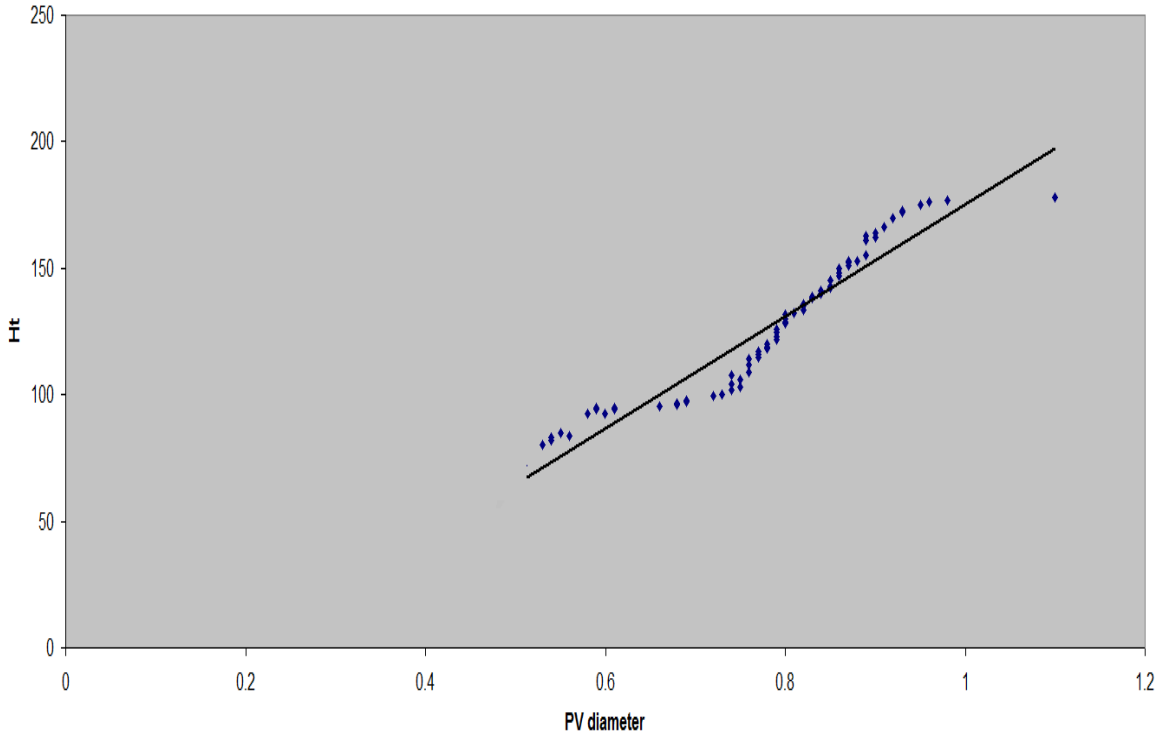

Fig. (11) : Correlation coefficient factor (r) between portal vein diameter and height.

Table (3) : Correlation coefficient factor (r) between common bile duct diameter and age , height(Ht) and weight (Wt).

Common bile duct diameter / Variable	Correlation coefficient (r)	P
Age	0.9765	< 0.001
Ht	0.8586	< 0.001
Wt	0.7898	< 0.001

P < 0.001= highly significant

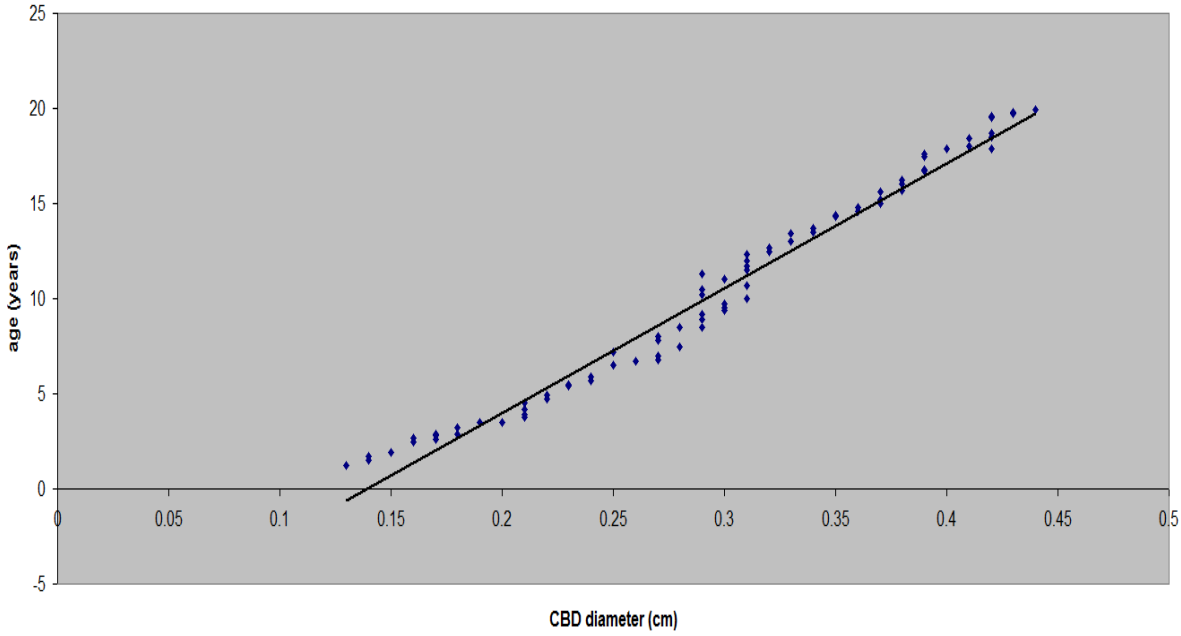

Fig. (12): Correlation coefficient facor (r) between common bile duct diameter and age

Table (4): Correlation coefficient factor (r) between the lengths of spleen, right and left lobes of the liver and the height of the studied groups.

Height / Variables		Correlation coefficient factor (r)	P
Length of spleen	1<6 years	0.988	< 0.001
	6<12 years	0.958	< 0.001
	12-20 years	0.967	< 0.001
Length of right lobe of liver	1<6 years	0.987	< 0.001
	6<12 years	0.971	< 0.001
	12-20 years	0.979	< 0.001
Length of left lobe of liver	1<6 years	0.973	< 0.001
	6<12 years	0.986	< 0.001
	12-20 years	0.971	< 0.001

P < 0.001= highly significant

Table (5) : Correlation coefficient factor (r) between the lengths of spleen, right and left lobes of the liver and the weight of the studied groups .

weight / Variables		Correlation coefficient (r)	P
Length of spleen	1<6 years	0.949	< 0.001
	6<12 years	0.94	< 0.001
	12-20 years	0.848	< 0.001
Length of right lobe of liver	1<6 years	0.967	< 0.001
	6<12 years	0.939	< 0.001
	12-20 years	0.870	< 0.001
Length of left lobe of liver	1<6 years	0.986	< 0.001
	6<12 years	0.968	< 0.001
	12-20 years	0.884	< 0.001

P < 0.001= highly significant

Table (6) : The mean and standard deviation (($\overline{X}$) ±SD) of portal vein diameter (cm) among the studied group according to sex.

Sex \ Age	1 < 6 years	6<12 years	12-20 years
Male ($\overline{X}$) ± SD	0.63 ± 0.09	0.79 ± 0.02	0.91 ± 0.07
Female ($\overline{X}$) ± SD	0.64 ± 0.09	0.79 ± 0.02	0.89 ± 0.04
T	0.35	-	1.11
P	> 0.05	> 0.05	> 0.05

P > 0.05 = Non significant

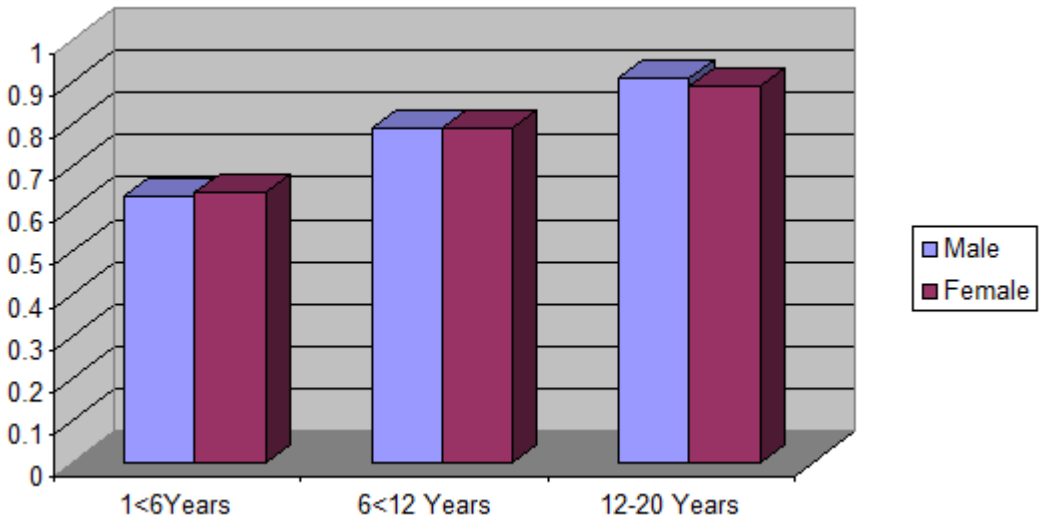

Fig. (13) : A histogram showing: The portal vein diameter (cm) in males and females in different age groups

Table (7) : The mean and standard deviation (($\overline{X}$) ± SD) of bile duct diameter (cm) among the studied groups according to sex.

Age / Sex	1 < 6 years	6< 12 years	12 – 20 years
Male ($\overline{X}$) ± SD	0.18 ± 0.04	0.29 ± 0.02	0.38 ± 0.04
Female ($\overline{X}$) ± SD	0.18 ± 0.04	0.28 ± 0.02	0.38 ± 0.04
t	_	1.58	_
P	> 0.05	> 0.05	> 0.05

P > 0.05 = Non significant

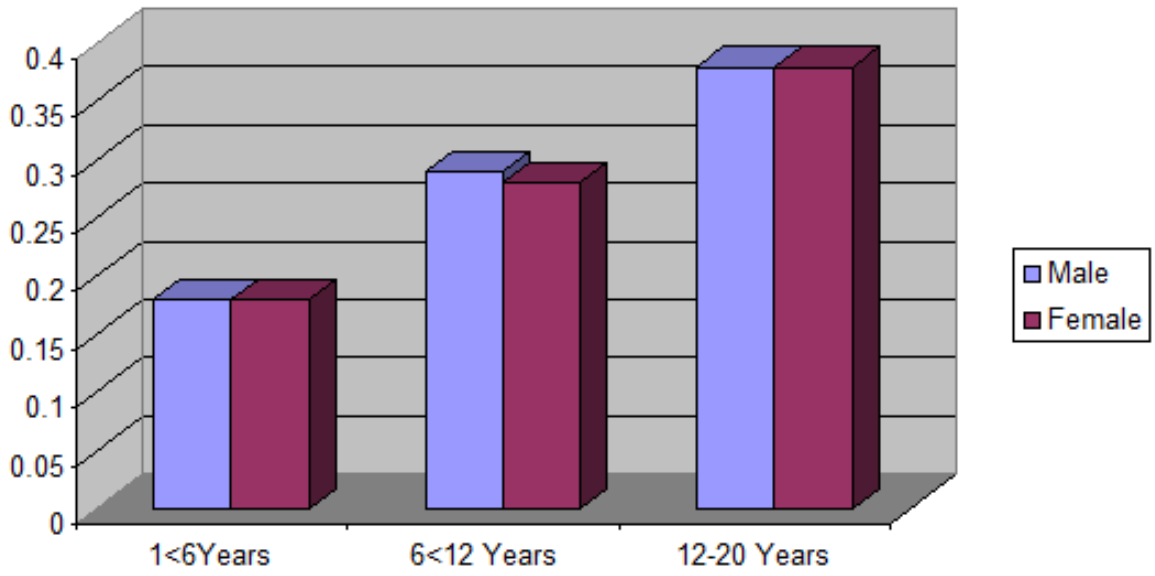

Fig. (14) : A histogram showing: The common bile duct diameter (cm) in males and females in different age groups.

Table (8) : The mean and standard deviation (($\overline{X}$)±SD) of splenic length (cm) among the studied groups according to sex.

Sex \ Age	1 <6 year	6< 12 years	12 – 20 years
Male ($\overline{X}$) ± SD	7.26 ± 0.8	8.93± 0.4	10.3 ± 0.7
Female ($\overline{X}$) ± SD	7.33 ± 0.8	8.99 ± 0.4	10.24 ± 0.7
T	0.28	0.47	0.27
P	> 0.05	> 0.05	> 0.05

P > 0.05 = Non significant

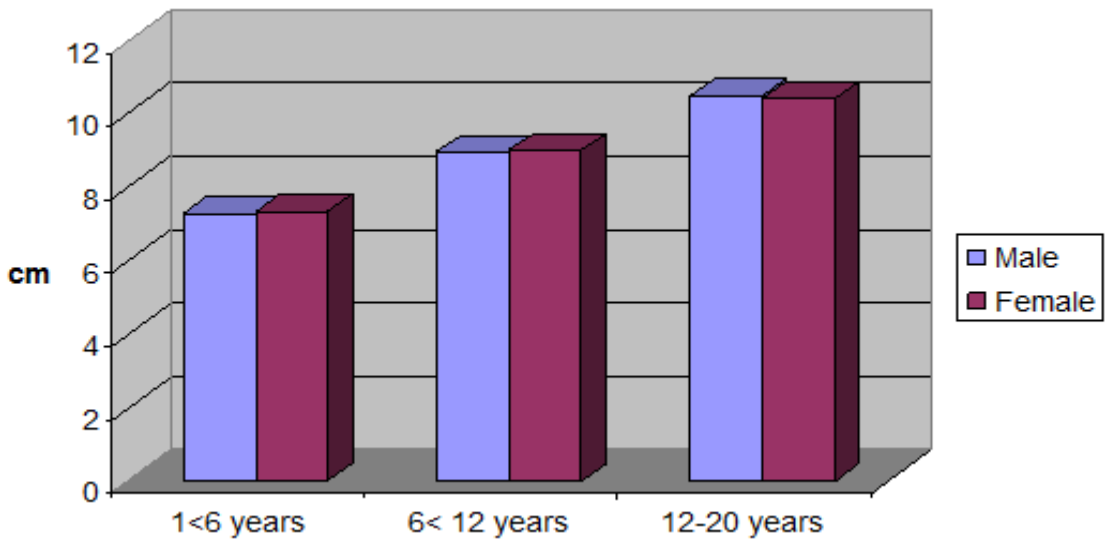

Fig. (15): A histogram showing: The splenic length(cm) in males and females in different age groups.

Table (9) : The mean and standard deviation (($\overline{X}$) ±SD) of length of right lobe of the liver (cm) among the studied groups according to sex.

Age / Sex	1 < 6 years	6<12 years	12 – 20 years
Male ($\overline{X}$) ± SD	7.32 ± 0.8	10.08 ± 0.4	11.88 ± 0.5
Female ($\overline{X}$) ± SD	7.4 ± 0.7	10.1 ± 0.4	11.81 ± 0.4
t	0.34	0.16	0.44
P	> 0.05	> 0.05	> 0.05

P > 0.05 = Non significant

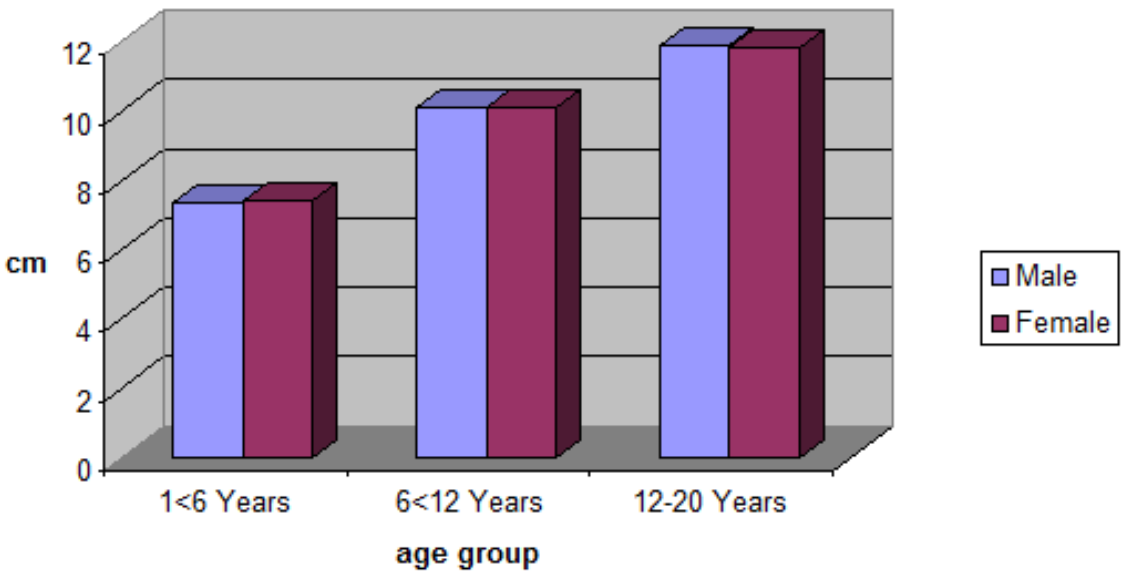

Fig. (16) : A histogram showing: The splenic length (cm) in males and female in different age groups.

Table (10) : The mean and standard deviation (($\overline{X}$) ±SD) of length of left lobe of the liver (cm) among the studied groups according to sex.

Age / Sex	1 < 6 years	6<12 years	12 – 20 years
Male ($\overline{X}$) ± SD	5.76 ± 0.6	7.47 ± 0.3	8.75 ± 0.4
Female ($\overline{X}$) ± SD	5.7 ± 0.06	7.48 ± 0.3	8.71 ± 0.4
t	0.31	0.11	0.32
P	> 0.05	> 0.05	> 0.05

P > 0.05 = Non significant

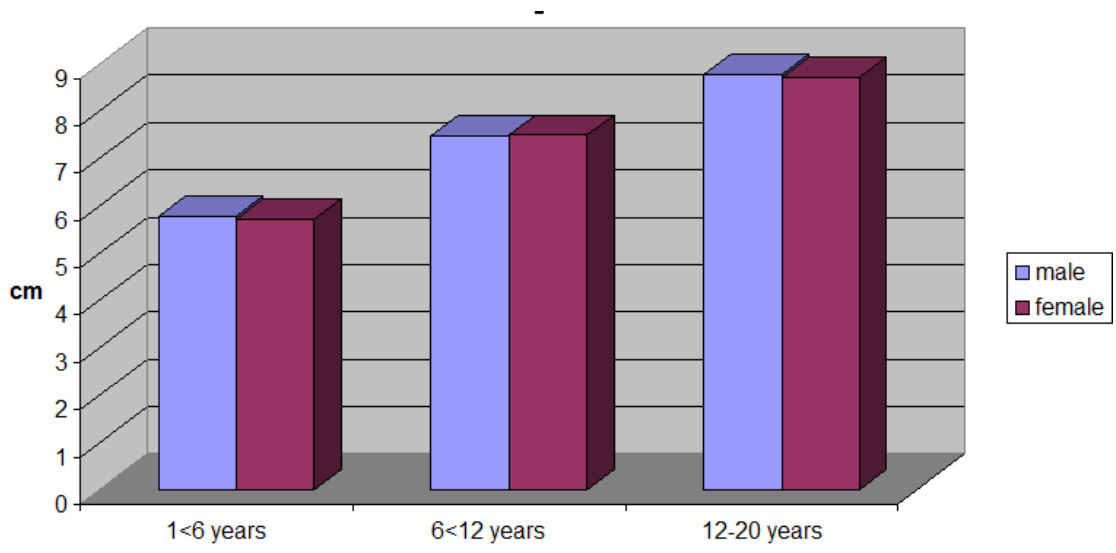

Fig. (17) : A histogram showing: The splenic length (cm) in males and females in different age groups.

Fig (18): A photograph of abdominal ultrasonography of a child aging 3.5 years (1st group) Showing **:** The anteroposterior diameter of portal vein (PV) and common bile duct (CBD) at the porta hepatis. Notice**:** Anterior abdominal wall= (A).

Fig (19): A photograph of abdominal ultrasonography of a child aging 5.5 years (1st group) Showing **:** The anteroposterior diameter of portal vein (PV) and common bile duct (CBD) at the porta hepatis. Notice: Anterior abdominal wall= (A).

Fig (20): A photograph of abdominal ultrasonography of a child aging 8.5 years (2^{nd} group) Showing : The anteroposterior diameter of portal vein (PV) and common bile duct (CBD) at the porta hepatis. Notice: Anterior abdominal wall= (A).

Fig (21): A photograph of abdominal ultrasonography of a child aging 11.5 years (2^{nd} group) Showing : The anteroposterior diameter of portal vein (PV) and common bile duct (CBD) at the porta hepatis. Notice: Anterior abdominal wall= (A).

Fig (22): A photograph of abdominal ultrasonography of an adolescent aging 13 years (3^{rd} group) Showing : The anteroposterior diameter of portal vein (PV) and common bile duct (CBD) at the porta hepatis. Notice: (A) = Anterior abdominal wall

Fig (23): A photograph of abdominal ultrasonography of an adolescent aging 15 years (3rd group) Showing : The antroposterior diameter of portal vein (PV) and common bile duct (CBD) at the porta hepatis. Notice: Anterior abdominal wall= (A).

Fig(24): A photograph of abdominal ultrasonography of a child aging 3.5 years (1^{st} group)

Showing : The length of the spleen.

Notice: Anterior abdominal wall= (A). The arrow shows left hemi diaphragm. (Left copula of diaphragm).

Fig (25): A photograph of abdominal ultrasonography of a child aging 8.5 years (2^{nd} group)

Showing : The length of the spleen.

Notice: Anterior abdominal wall= (A). The arrow shows left hemi diaphragm. (Left copula of diaphragm).

Fig (26): A photograph of abdominal ultrasonography of an adolescent aging 15 years (3rd group)

Showing : The length of the spleen.

Notice: Anterior abdominal wall= (A). The arrow shows left hemi diaphragm. (Left copula of diaphragm).

Fig (27): A photograph of abdominal ultrasonography of a child aging 3.5 years (1^{st} group)
Showing **:** The length of right lobe of the liver. Notice**:** RT. LOBE = Right lobe. Anterior abdominal wall= (A)
Rt. Kidney = Right kidney. the arrow shows right hemi diaphragm= (Right copula of diaphragm).

Fig (28): A photograph of abdominal ultrasonography of a child aging 8.5 years (2^{nd} group)
Showing : The length of right lobe of the liver. Notice: Anterior abdominal wall= (A) ,
Rt. kidney= Right kidney. The arrow shows right hemi diaphragm. (Right copula of diaphragm).

Fig (29): A photograph of abdominal ultrasonography of an adolescent aging 15 years (3rd group) Showing :The length of right lobe of the liver. Notice: RT. LOBE =Right lobe of liver , Rt. kidney= Right kidney , (A)= Anterior abdominal wall , the arrow shows right hemi diaphragm. (Right copula of diaphragm).

Fig (30): A photograph of abdominal ultrasonography of a child aging 3.5 years (1^{st} group)
Showing **:** The length of left lobe of the liver. Notice**:** LT. LOBE= Left lobe. Anterior abdominal wall= (A)

Fig (31): A photograph of abdominal ultrasonography of a child aging 8.5 years (^{2nd} group)
Showing : The length of left lobe of the liver. Notice: Anterior abdominal wall = (A)

Fig (32): A photograph of abdominal ultrasonography of an adolescent aging 15 years (3rd group)

Showing : The length of left lobe of the liver.

Notice: LT. LOBE = Lt. lobe of liver, (A)= Anterior abdominal wall