ORIGINAL RESEARCH PAPER
Volume - 13 | Issue - 09 | September - 2024 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

PREVALENCE OF INCIDENTAL ULTRASOUND ABDOMEN AND PELVIS FINDINGS ALONG WITH NORMAL RANGE OF MEASUREMENTS IN HEALTHY YOUNG FEMALE POPULATION FROM NORTH INDIA

Radio-Diagnosis

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ABSTRACT

Normal size of Liver, Spleen, Kidneys in Indian population is not published till now. We rely on western literature to decide the abnormal values, which may not be correct. Even the prevalence of gallstones, renal stones etc. are not known for Indian population. This study aims to provide objectivity in a subset of healthy Indian population. Ultrasound abdomen performed in young healthy females and attempt made to develop the normogram.

KEYWORDS

Indian, Ultrasound, Cholelithiasis, Liver, Spleen, Kidney, stone, size, normogram

INTRODUCTION:
Very few studies have been done to document the normal size range of commonly measured intrabdominal organs [1]. The study highlights the common incidental asymptomatic findings and gives expected upper limit of sizes of Liver, Spleen and kidneys in a subset of Indian population. Though the access to the ultrasound has reached to majority of the population we lack the adequate Indian data to decide what is normal for us. Western limited data and few of the Indian studies in different subset are grossly inadequate for generalization.

Subjects and methods
It was a cross sectional observational study. Consecutive 614 study population underwent USG on Samsung MEDISON machine (Samsung Medison Co.Ltd. Republic of Korea). All the subjects were healthy without any clinical symptoms. Ultrasound done in empty stomach and optimally distended urinary bladder. All necessary pre procedure formalities done. Study population consisted of unmarried girls of age group 17-20 years. They were from north India (Delhi, Haryana, J & K, Uttarakhand, Himachal Pradesh, Punjab, Rajasthan, Uttar Pradesh). Their height, weight, chest, waist was measured. Body Mass Index (BMI) was also calculated. Ultrasound of the abdomen and the pelvis was performed.

RESULTS:
The studied population consisted of young healthy females. Their anthropometric measurements are shown in the table 1.

Incidental findings were noted in 23 subjects (supplementary material), with few with multiple findings. Rest of the 591 subjects revealed no significant findings. Measurements of lengths of Liver, Spleen and bilateral kidneys were done in all the subjects. Screening pelvis scan was done (only transabdominal) and findings were noted.

The dimension of Liver was measured in the mid hepatic line. The Liver size varied from 9.8 cm -14.5 cm. The mean size was 12.51 cm +/-3.82 (Table-2). Though the size > 15.5 cm is suggested as hepatomegaly, the normal size range is not known [2].

Maximum craniocaudal lengths were measured for spleen (with splenic hilum also in the Field of View) and kidneys. For the spleen size and determination of splenomegaly, the commonest method is eyeballing [3]. The spleen size varied from 6.31 cm- 12.5 cm. The mean size was 8.81 cm +/-1.14 (Table -2). One subject had spleen size of 15.2 cm, which was labelled as splenomegaly and further assessment was suggested.

The renal sizes also showed marked variations, with size varying from 3-12.3 cm for the right kidney and 5-12.2 cm for the left kidney. One subject had renal sizes of 3 cm and 5 cm (Right and Left respectively). One had sizes of 10 cm and 6.5 cm for the Right and Left kidney respectively and congenitally small left kidney was inferred. The left kidney mean size was marginally larger compared to the right. The mean size of the right kidney was 9.72 cm +/- 0.84 and left kidney was 9.88 cm +/- 0.72 (Table-2). Size up to 11 cm has been considered to be normal as per western literature [4].

Incidentally noted findings pertained mostly to the hepatobiliary system. A total of 8 subjects has gallstones (1.3 %). This does not match the relatively high prevalence quoted in a western literature [5] One subject has haemangioma Liver (0.16 %) again contradicting the existing western literature [4]. A total of 3 subjects had calculi (two were non obstructive renal calculi, one had obstructive Pelviureteric junction calculus). The prevalence of 0.49 %, is against the high prevalence of 12 % noted in the literature [6].

Chest and waist measurements had strong correlation with the Body Mass Index (BMI). Organ size with respect to anthropometric measurements are shown by figure 1.

DISCUSSION:
To determine what is normal remains a challenge in medical sciences as there are so many factors and confounders. There are variations due to age, sex, height, weight, ethnicity. Normograms for normal range of measurements of intra-abdominal organs is not available either in the Indian or in the world literature. A study to develop the same has been made for paediatric patient [7] Adequate attempts have not been made to develop the Indian database. Sooner we realize and attempt to move in this direction, is better.

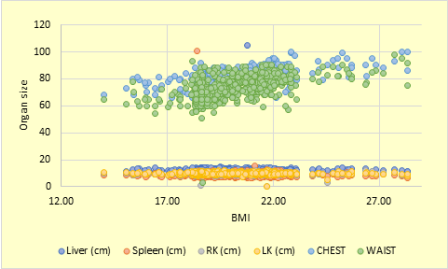
This study attempts to initiate a massive task of developing the Indian population database. With more and more access to the ultrasound for the Indian population, it is only a matter of time that more and more researchers work in this direction and advance the legacy of the healthcare in India.

Limitations:
The study has relatively small sample size. It represents a particular sex population from north India. More studies with bigger sample sizes will further strengthen the Indian data base and prevalence of incidental findings.

CONCLUSION:
Our study is first from the country which is trying to develop the normograms for the Indian population in young adults. More and more studies are needed to develop the Indian database.

Declaration of patient consent:
The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship:
Nil.
Conflicts of interest:
There are no conflicts of interest.



Figure/chart 1:

Table 1:

	Mean±SD	Median(min-max)
Height	2.80±0.25	2.82 (0.51-3.57)
Weight	56.39±7.95	56 (4-92)
BMI	20.14±2.67	19.83 (1.62-115.74)
Chest	80.130±5.97	80 (54-104)
Waist	73.04±14.31	72 (44-98)

Anthropometric parameters: study subjects

Table 2:

	Mean±SD	Median(min-max)
Liver	12.51±3.82	12.4 (9.8-10.5)
Spleen	8.81±1.14	8.7 (6.2-15.2)
Right Kidney	9.72±0.84	9.7 (1.3-12.3)
Left Kidney	9.88±0.72	9.8 (5-12.2)

Mean and median sizes of the Liver, Spleen, Right and Left kidney

Table 3:

BMI vs.	r	95% confidence interval	P-value
Liver (cm)	0.01876	-0.06053 to 0.09780	0.643
Spleen (cm)	-0.04054	-0.1194 to 0.03877	0.3163
RK (cm)	0.03566	-0.04365 to 0.1145	0.3781
LK (cm)	-0.06709	-0.1456 to 0.01223	0.0973
CHEST	0.6294	0.5790 to 0.6749	**<0.0001***
WAIST	0.5412	0.4827 to 0.5949	**<0.0001***

Body Mass Index (BMI) and various parameters and their statistical significance

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