ISSN: 1813-1638

The Medical Journal of Tikrit University

Available online at: www.mjotu.com

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***Keywords*:**

Pneumonia , severity score

ARTICLE INFO

Article history:

Received 03 May 2022
Accepted 05 Jun 2022
Available online 01 Sep 2022

Assessment the Severity of Pneumonia Using Pediatric Respiratory Severity Score (PRESS) at Salah Aldeen General Hospital

ABSTRACT

Backgrownd : Pneumonia is a significant causes of respiratory morbidity and mortality in children especially in developing countries worldwide is the leading causes of death in children younger than 5 year. Sever pneumonia characterized by high fever and difficulty breathing and can be fatal it is critical there fore to assess the severity of condition during initial bedside assessment in emergency department by using pediatric respiratory severity score. The PRESS score which depend on respiratory rate ,wheezing ,accessory muscle use ,spo2 and difficulty feeding.

Aim: This study done to evaluate the role of The Pediatric respiratory severity score (PRESS) as screening test for assessment of severity of pneumonia.

Patient and method: Convenient sample hospital based selective study done on patient attending emergency department at Salah Aldeen General Hospital who complain from shortness of breathing during the period from May 2017 to 13November 2017 .The study included 52 children there age from 0-60 month .Each patient included in the study were assessed by prepared questionnaire from parents include (name ,age ,sex, residence ,type of feeding screening done by general examination including respiratory rate and sings of dyspnia that include tachypnea , use of accessory muscle, wheeze ,and chest indrawing . Each patient examined for chest examination looking for crepitation and ronchi ,each patient where assessed by Acute Respiratory infection World health Organization program (ARI) . Each patient also assessed by pediatric respiratory severity score (PRESS) that include respiratory rate wheezing , accessory muscle use , feeding difficulties ,and SPO2 level above 95%.And each patient assessed by community acquired pneumonia (CAP) score. The diagnosis of pneumonia when done by CXR with x-ray report from experience radiologist .

Results: The total number of cases 52 case32 (62%) male and 20 (38%)female. Most of study cases from urban 31 (60%) and age 3-12 month age was23 (44%) most of cases had tachypnea 35(67%) and with bottle feeding 28(54%). Most of cases had history of upper respiratory tract infection 42(81%) and 30(58%) of cases not taken vaccination. According to community acquired pneumonia (CAP) severity score. Most of cases with mild to moderate CAP 29 (56%) and according to acute respiratory infection (ARI) program found most of cases with very severe illness 28(54%) and according to pediatric respiratory severity score PRESS where found most of cases with sever pneumonia 26 (50%) according to radiological finding most of cases where multifocal pneumonia 24 (46%).

Conclusion: The PRESS was sensitive as ARI score but the specoificity was similar to CAP score . So it is recommended that the use of PRESS score for assessment of pneumonis in children 0-6 months age.

DOI: http://dx.doi.org/10.25130/mjotu.28.2022.12

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Introduction:

Pneumonia is a form of acute respiratory infection that affects the lungs. The lungs are made up of small sacs called alveoli, which fill with air when a healthy person breathes ,when an individual has pneumonia the alveoli are filled with pus and fluid, which make breathing painful and limits oxygen intake. [1] Pneumonia is the single largest infectious cause of death in children world wide accounting for 16% of all death of children under 5 years old age. Pneumonia is caused by a number of infectious agents like streptococcus pneumonia, *heamophillius influenza*, respiratory syncytial virus, in infant with *HIV pneumocystis carina* is one of most common cause of pneumonia responsible for at least one quarter of all pneumonia death in HIV infants. [2]Pneumonia can spread in a number of way, the virus and bacteria that are commonly found in child nose or throat can infect the lungs if they are inhaled ,they may also spread via air born droplets from cough or sneeze ,in addition pneumonia may spread through blood, especially during and shortly after birth . [4]

Accessory muscle use, difficulty of feeding and SPO2 . [5] Accessasary muscle use was defined as visible retraction of one more of the sternomastiod \ suprasternal, intercostal, subcostal muscle .Wheezing was defined hearing and rhonchi by auscultation. The SPO2 evaluated as above or below 95%. Feeding difficulties were assess using information provided by the parents each component was given 0or 1 point and the PRESS total score was classified as mild (0-1), moderate (2-3) sever (4-5). [5, 6]

Aim of the study:

To decrease mortality and morbidity among patient with pneumonia by early detection using PRESS severity score .

Patient and Method:

The study cases (pneumonia cases) were taken from the emergency word at Salah Aldeen General Hospital.

Convenient sample based selective study done on patient attending emergency department at Salah Aldeen General Hospital age between 0-60 month who complain from shortness of breathing lasting less than 2 days during the period from11 May 2017 to 31 November 2017.

Before starting the study a written acceptance from the hospital and oral acceptance from the parents of each patient included in the study were obtained .Each patient included in study where assessed by prepared questioner that include name , age, sex ,etc.

Each patient where examined for general examination including respiratory rate and sings of dyspnea that include tachypnea, use of accessory muscle wheeze and chest in drawing. Each patient examined for chest, examination looking for crepitation and rhonchi .Each patient were assessed by ARI program (the WHO program for acute respiratory infection).

Each patient also assessed by PRESS score that include respiratory rate ,wheezing , accessory muscle use , feeding difficulties and SPO2 above or below 95%.

And each patient assessed by assessment of severity of pneumonia by community acquired pneumonia (CAP).

1-Sever pneumonia presence of one of respiratory rate increase ,shortness of breathing sings ,SPO2 less than 93 %,delay capillary refill more than 2 second ,decreased feeding .

2-Mild to moderate pneumonia include respiratory rate increase , shortness of breathing sings , SPO2 more than 93% capillary refill normal less than 2 second. Well feeding.

The diagnosis of pneumonia when done by CXR with x-ray report from expert radiologist .the radiological classification of pneumonia include:

1-Sever pneumonia multifocal pneumonia in which more than 2 sites involvement unilateral or bilateral.

2- Unifocal pneumonia or one sits involvement.

3- Mild increased lung mar king.

4. Inclusion criteria:

1-Patient age 0-60 month.

2- Patient with shortness of breathing less than 2 days which included used of accessory muscle with or without tachypnea or cyanosis .

3-Evidence of URTI (cold and flu).

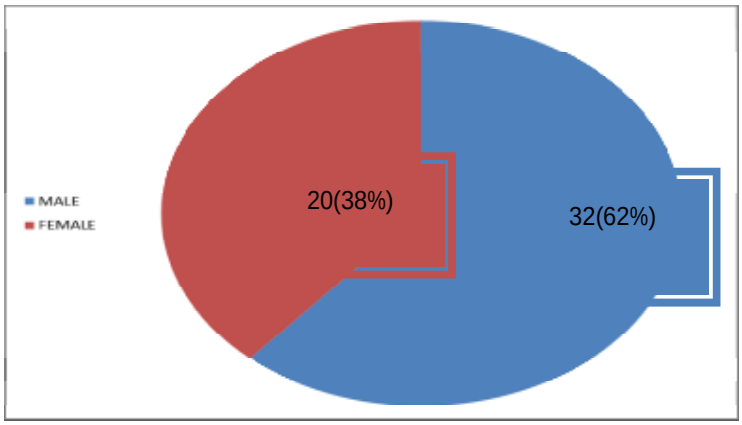
5. Exclusion criteria:

1-Age more than 5 year as this age is not the target age by WHO.

2.Patient with congenital heart disease

Results:

.Total number of study cases 52 About 32(62%) of sample was male and 20(38%) female show in figure (4-1).



Figure(4- 1): distribution of study cases according to sex.

.Distribution of study cases according to residence most of study cases of urban 31 (60%) and rural 21 (40%) show in Figure(4-2).

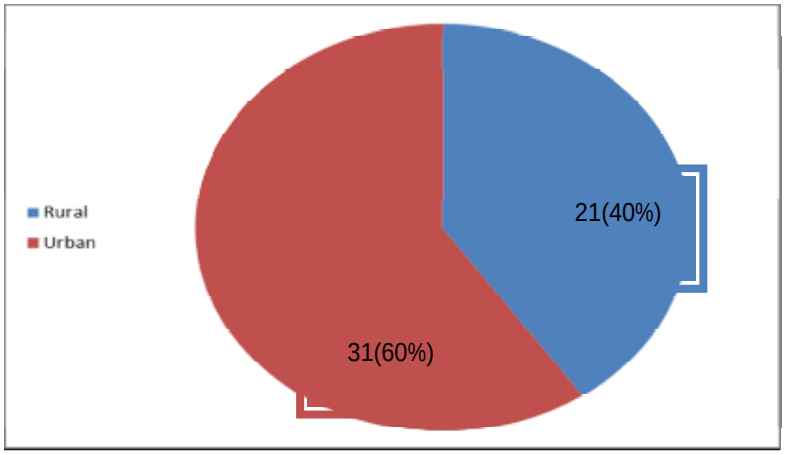


Figure (4- 2): show distribution of study cases according to residence

Table (4- 1) Distribution of study cases according to age:

Most frequent cases was among age group 3-12 month 23(44%) followed by 13-36 month 15(29%) .Then among age group 0-2month 10 (19%).And lastly among 37-60 month 4 (8%).

Table (4- 1): Distribution of study cases according to age

Age	Male	Female	Total
0-2 month	5 (16%)	5 (25%)	10 (19%)
3-12 month	16 (50%)	7 (35%)	23 (44%)
13-36 month	8 (25%)	7 (35%)	15 (29%)
37-60 month	3 (9%)	1 (5%)	4 (8%)
Total	32 (100%)	20 (100%)	52(100%)

. My study shows that 35 (67%) having tachypnea and 17 (33%) have no tachypnea as shown in Figure (4-3).

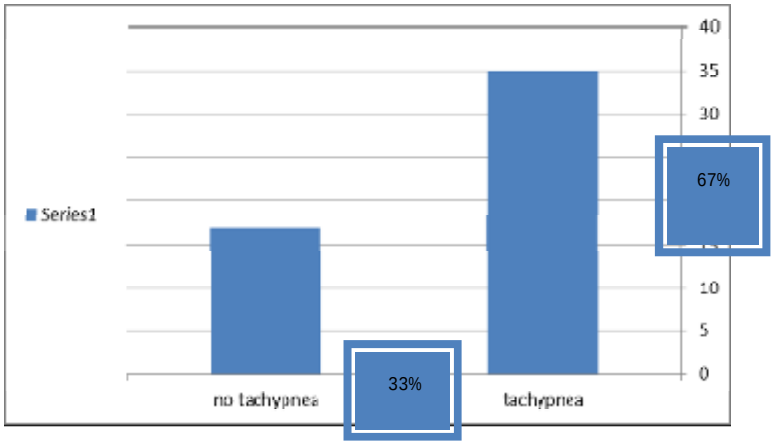


Figure (4-3):show distribution of study cases according to tachypnea

.In the current study the most frequent cases those with bottle feeding 28(54%) ,followed by breast feeding 15 (29%).And the last was among those with mixed 9(17%)

Table (4-2): distribution of study cases according of type of feeding.

Type of feeding	Male	Female	Total
Breast feeding	10 (31%)	5(25%)	15 (29%)
Bottle feeding	17(53%)	11(55%)	28 (54%)
mixed	5(16%)	4 (20%)	9 (17%)
Total	32 (100%)	20(100%)	52(100%)

. The results of my study show that most of cases with history of upper respiratory tract infection 42(81%) .And 36(69%)with history of aspiration. About 27(48%)with history of recurrences and 20 (38%) with family history of allergy .lastly 30(58%) not taken vaccination as seen in table(4-3).

Table :(4-3) distribution of study cases according to some risk Factor that precipitate respiratory illness.

Factor		Male	female	Total
Upper respiratory tract infection	yes	26(81%)	16(80%)	42(81%)
	no	6(19%)	4(20%)	10(19%)
aspiration	yes	6(19%)	10(50%)	16(31%)
	no	26(81%)	10(50%)	36(69%)
Family history of allergy	yes	11(34%)	9(45%)	20(38%)
	no	21(66%)	11(55%)	32(62%)
recurrence	yes	16(50%)	11(55%)	27(52%)
	no	16(50%0	9(45%)	25(48%)
vaccination	yes	13(41%)	9(45%)	22(42%)
	no	19(59%)	11(55%)	30(58%)

. According to CAP severity score 29(56%) classified as mild to moderate CAP and 23(44%) as sever CAP. And most of cases from male gender.

Table(4-4):distribution of study cases according to CAP severity score

severity	male	female	Total
Sever CAP	15(47%)	8(40%)	23(44%)
Mild to moderate CAP	17(53%)	12(60%)	29(56%)
total	32(100%)	20(100%)	52(100%)

.According to ARI program 28 (54%) with very sever illness fallowed by 15(29%) with sever pneumonia .And 9(17%) with pneumonia and no case with cough and cold as shown in Table (4-5).

Table (4-5): distribution of study cases according to ARI program

ARI program	Male	Female	Total
Very severe illness	17(53%)	11(55%)	28(54%)
Sever pneumonia	10(31%)	5(25%)	15(29%)
pneumonia	5(16%)	4(20%)	9(17%)
Cold and cough	0	0	0
Total	32(100%)	20(100%)	52(100%)

. According to PRESS score most of cases with sever pneumonia 26(50%) , 13(25%) with moderate pneumonia. Mild about 12(25%) .Male most frequent gender as seen in Table (4-6).

Table (4-6): distribution of study cases according to PRESS score

Press score	Male	female	Total
Mild 0-1	8(25%)	5(25%)	13(25%)
Moderate 2-3	8(25%)	5(25%)	13(25%)
Sever 4-5	16(50%)	10(50%)	26(50%)
Total	32(100%)	20(100%)	52(100%)

.In my study the distribution of cases according to radiological finding shows the most of cases multifocal 24(46%)and ,11(21%) focal fallowed by 10(19%) increase lung marking and about 7(19%) with normal X-ray male gender was most frequent among all radiological finding as shown in Table (4-7).

Table (4-7): distribution of study cases according to radiological finding.

Radiological finding	male	female	Total
Multifocal	15(47%)	9(45%)	24(46%)
focal	7(22%)	4(20%)	11(21%)
Increase lung marking	6(19%)	4(20%)	10(19%)
normal	4(12%)	3(15%)	7(14%)
Total	32(100%)	20(100%)	52(100%)

. According to radiological finding in regard to CAP severity score .Most sever CAP score cases associated with multifocal radiological finding 21(88%) ,1(9%) with focal ,1(10%) with increase lung marking . Mild to moderate CAP cases most of cases 10(91%)with focal radiological finding ,about 9(90%) with increase lung marking ,3(12%) with multifocal and 7(100%) with normal radiological finding as seen in Table (4-8).

Table :(4-8) distribution of study cases according to radiological finding in regard to CAP severity score.

CAP severity score	multifocal	focal	Increase lung marking	normal	Total
Sever CAP	21(88%)	1(9%)	1(10%)	0	23(44%)
Mild to moderate CAP	3(12%)	10(91%)	9 (90%)	7(100%)	29(56%)
Total	24(100%)	11(100%)	10(100%)	7(100%)	52(100%)

.Relation between sever CAP score and multifocal radiological finding. That show Sensitivity=87.5% Specificity= 92,9% as seen in Table (4-9).

Table (4-9). Relation between sever CAP score and multifocal radiological finding.

Sever CAP score	Multifocal radiological finding +ve -ve		Total
+ve	21(88%)	2(7%)	23(44%)
-ve	3(12%)	26(93%)	29(56%)
Total	24(100%)	28(100%)	52(100%)

Sensitivity=87.5%

Specificity= 92,9%

. Distribution of study cases according to radiological finding in regard to ARI program .Most of cases with very sever illness and multifocal radiological finding 23(96%) ,increase lung marking 2(20%) ,focal 2(18%) ,1(4%)with normal radiological finding . fallowed by Sever pneumonia about 9(82%) with focal ,3(30%)with increase lung marking ,2(29%) with normal . And 1(4%)multifocal radiological finding

.Regarding pneumonia 5(50%) with increase lung marking ,4(57%) with normal radiological finding as seen in Table (4-10).

Table :(4- 10) distribution of study cases according to radiological finding in regard to ARI program.

ARI program	Radiological finding				Total
	multifocal	focal	Increase lung marking	normal	
Very severe illness	23(96%)	2(18%)	2(20%)	1(4%)	28(54%)
Sever pneumonia	1(4%)	9(82%)	3(30%)	2(29%)	15(29%)
Pneumonia	0	0	5(50%)	4(57%)	9(17%)
Cough and cold	0	0	0	0	0
Total	24(100%)	11(100%)	10(100%)	7(100%)	52(100%)

.Relation between ARI program very sever illness and multifocal radiological finding that shows Sensitivity=95,8% Specificity= 82,1% as seen in Table (4-11).

Table (4-11) Relation between ARI program very sever illness and multifocal radiological finding

Very sever illness	Multifocal radiological finding		Total
	+ve	-ve	
+ve	23(96%)	5(18%)	28(54%)
-ve	1(4%)	23(82%)	24(46%)
Total	24(100%)	28(100%)	52(100%)

Sensitivity=95,8% Specificity= 82,1%

.Distribution of study cases according to radiological finding in regard to PRESS score. That shows most cases with sever score and multifocal radiological finding 23(96%),2(18%)with focal and 1(10%) with increase lung marking. Regarding moderate score 9(82%) focal ,2(20%) increase lung marking ,1(14%) with normal X-.ray. 1(4%) associated with multifocal radiological finding. Lastly Mild score include 7(70%)increase lung marking and 6(86%)with normal X-ray as shown in Table (4-12)

Table (4-12): distribution of study cases according to radiological finding in regard to PRESS score:

PRESS score	Radiological finding				Total
	multifocal	Focal	Increase lung marking	normal	
Mild	0	0	7(70%)	6(86%)	13(25%)
moderate	1(4%)	9(82%)	2(20%)	1(14%)	13(25%)
sever	23(96%)	2(18%)	1(10%)	0	26(50%)
Total	24(100%)	11(100%)	10(100%)	7(100%)	52(100%)

.Relation between PRESS score sever type and multifocal radiological finding that shows Sensitivity= 95% Specificity=89,3% as seen in Table (4-13)

Table (4-13) Relation between PRESS score sever and multifocal radiological finding

sever PRESS score	Multifocal radiological finding +ve -ve		Total
+ve	23(96%)	3(11%)	26(50%)
-ve	1(4%)	25(89%)	26(50%)
Total	24(100%)	28(100%)	52(100%)

Sensitivity= 95%

Specificity=89,3%

.Table(4-14)show distribution of study cases according to PRESS score in regard to ARI program .were found the chi-square statistic is 36,04873.the p-value is< 0,00001.the result is significant at p –value <0,05.

Table(4-14): Distributions of study cases according to the PRESS score in regard to ARI program:

ARI program	PRESS score			
	Mild	Moderate	Sever	Total
Pneumonia	7 (54%)	1 (8%)	1 (4%)	9 (17%)
Sever pneumonia	4 (31%)	9 (69%)	2 (8%)	15 (29%)
Very sever illness	2 (15%)	3 (23%)	23 (88%)	28 (54%)
Total	13 (100%)	13 (100%)	26 (100%)	52 (100%)

Chi square p- value <0,05 (significant).

.This study show the distributions of study cases according to the PRESS score in regard to CAP severity score .were found fisher Exact test exact probability=0,00000117 p-value significant difference as seen in Table (4-15).

Table(4-15): Distributions of study cases according to the PRESS score in regard to CAP severity score:

CAP Score	PRESS Score			
	Mild	Moderate	Severe	Total
Mild to moderate CAP	13 (100%)	10 (77%)	6 (23%)	29 (56%)
Sever CAP	0	3 (23%)	20 (77%)	23 (44%)
Total	13 (100%)	13 (100%)	26 (100%)	52 (100%)

Fisher test

p-value <0,05(significant).

Discussion:

Pneumonia is potentially serious infection in children and often result in hospitalization .[1]Factor that increase incidence and severity of pneumonia children include prematurity, malnutrition ,low socioeconomic status to exposure tobacco smoke and child care attendance. [5]The diagnosis can be based on the history and physical examination results in children with fever plus respiratory singes and symptoms . [8] Chest radiography and rapid viral testing may be helpful when the diagnosis is unclear. [9]

Most of cases were of sever categories this not superposes Fujitsuka A, Tsukagoshi H, study in which most of cases mild type pneumonia this difference in the sample size .And this with same study that show the hospitalization rate higher in moderate and sever groups than in mild groups due to same reason mention above in that most of study cases were of severe illness that attended the emergency department. [10]

Regarding sensitivity still ARI program is the most sensitive screening test for assessment of pneumonia followed by PRESS score this may be due to difference in the sample size and still the WHO recommend ARI program as screening test for assessment respiratory illness. Regarding specificity CAP scoring system is the most specific test for pneumonia this superposes Kin Key N, Araújo-Neto CA study which show in comparison the children with mild and moderate CAP ,there was significant greater frequency of bilateral multifocal distribution .And the involvement of equal to3or more sites and the involvement of right hilum in those with sever CAP

Follow by PRRSS score and this may be due to difference in the sample size from the study . It is found that PRESS score is good for sensitivity (to pick up the disease early)and specificity to diagnosed sever pneumonia. As compares between all score still ARI program is more significant test used as screening for assessment the severity of pneumonia

followed by CAP score than PRESS score . [11]

Conclusion:

The study concluded that: the PRESS was sensitive as ARI score but the specoificity was similar to CAP score . So it is recommended that the use of PRESS score for assessment of pneumonis in children 0-6 months age.

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