CODEN [USA]: IAJPBB ISSN : 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES
SJIF Impact Factor: 7.187

Avalable online at: http://www.iajps.com *Research Article*

STUDY TO EVALUATE IMPACT OF CHEST X-RAY AND HRCT ON COVID-19

[1]Dr.Saira shafee

[1]Khawaja Muhammad safdar medical college Sialkot, [2]Dr.Muhammad Asif Shahzad ; Islamic International Medical College Rawalpindi.

Article Received: November 2020 **Accepted:** December 2020 **Published:** January 2021

Abstract:

This research study will basically involve the research on the aspects to do with Chest X-ray and high resolution computed tomography (HRCT) in relation to Covid-19 points. An intensive research is carried out to have proper understanding on the origin, spread and some of the Covid-19 preventative measures. The approach of this study will therefore be narrowed down by investigating the relationship between Chest X-ray, high resolution computed tomography (HRCT) and the Covid-19 points. The exploration on the relationship of these stated aspects will be done using the statistical technique of Correlation analysis.

Introduction: This pandemic disease emerged in China in November 2019 (Morens et al. 2020). The disease has negatively affected the daily life endeavors of individuals globally in terms of economical, social, and political affairs. As per recent medical research, the chest X-ray is a practice that is necessary to check and diagnose the chest status of a given individual (Cozzi et al. 2020). Hence, the research on this particular study will also put much focus on the impact of the chest X-ray as far as the detection and treatment of Covid 19 is concerned. On the other hand, the medical technique to do with high-resolution computed tomography is a technical method used to image the pathology of lungs (Lins et al. 2020). HCRT primarily involves the usage of narrow collimation of beam in imaging the lung parenchyma. HRCT is very essential as it enables the production of high-resolution images of the different parts of the lung such as the am alveoli, trachea, and interstitium (Lins et al. 2020). Hence, it will be also necessary to carry out a correlation analysis between HCRT and Covid-19.

Key words: *Chest X-ray, High resolution computed tomography (HRCT), Covid-19 points.*

Corresponding author:

Dr. Saira shafee,

Khawaja Muhammad safdar medical college Sialkot.

QR code

Please cite this article in press Saira shafee et al, ***Study To Evaluate Impact Of Chest X-Ray And Hrct On Covid-19.,*** *Indo Am. J. P. Sci, 2021; 08(1).*

INTRODUCTION:

Objective: The key objective of this particular research is to investigate the relationship between the chest X-ray and high resolution computed tomography (HRCT) on Covid-19 disease. Therefore, it is necessary to carry out correlation analysis to explore the impact of chest X-ray and HRCT on the detection and cure of the Covid-19 pandemic disease. Covid-19 is a pandemic disease associated with chest and breathing problems in humans.

Instruments and Methodology:

This Study was Conducted In Allama Iqbal Memorial Hospital from may 2019 November 2020 where Correlation analysis is a statistical technique that is essential in the investigation of the relationship of two variables under study (Vadivasova et al. 2020). The value of the correlation lies within -1 and 1. When the value of the correlation between two variables is close to -1, it implies that there is the existence of a strong negative significant relationship (Vadivasova et al. 2020). On the other hand, when the value of correlation is close to +1, it implies that there is the existence of a strong and positive significant relationship between the two variables under study. Correlation analysis is very essential as it can be applied in various areas. The various areas where correlation analysis can be applied are mainly in business organizations and the health industry. In this case of a research study, correlation analysis is going to be applied to the health investigation. The investigation using the correlation analysis is primarily on the relationship between the chest X-ray and high resolution computed tomography (HRCT). To conduct quantitative analysis using correlation analysis on the relationship between the chest x-ray and high resolution computed tomography (HRCT) on the covid-19 points, it is necessary to formulate well-organized data on both the dependent and the independent variable. Hence, in this case, the dependent variable will be represented by the covid-19 points. On the other hand, there is the existence of two independent variables, these variables include the high resolution computed tomography (HRCT) and chest X-ray. The formulated data on all the variables were formulated in numerics using a sample size of 40 participants. The regression analysis was applied which is also very critical as far as Pearson's correlation value is concerned. The hypothesis is also going to be formulated to achieve the objective of this study. The hypothesis is dived into two types, that is the alternative and the null hypothesis. The hypothesis is necessary to provide a framework for the conclusion of the relationship between the two variables of interest. The null and the alternative hypotheses of this particular study will be based on the relationship between the Chest X-ray, high resolution computed tomography (HRCT), and the Covid-19 points.

Literature Review:

The first case of Covid-19 was discovered by the health officials in Wuhan city in December 2019 in China (Ding et al. 2020). The Covid-19 disease was subsequently named SARS-Cov-2. Various human cases have been identified by the investigation bodies in Chinese authorities with prevailing signs and symptoms within the early days of December 2019 (Ding et al. 2020). A considerable number of the earlier cases of Covid-19 had been attached to the wholesale food supply in Wuhan city. A significant number of the initial patients of covid-19 were either regular visitors to the Wuhan market, stall owners, or the market employees. A huge percentage of the environmental samples obtained from the Wuhan market in December 2019 tested positive for Covid-19 (Ding et al. 2020). Therefore, these stipulated reasons provide sufficient evidence to conclude that the Wuhan city in China was the source of the outbreak of the Covid-19 pandemic disease.

Having the fact that the Covid-19 has emerged, serious health measures were put in place to curb the spread of this disease. The health measures that were put in place were basically on social distancing, regular hygiene of washing hands, Sanitization of the public environment especially where there was congestion of different categories of individuals and many others (Hamid, Mir & Rohela, 2020). The emergence and spread of the Covid-19 disease have also resulted in the loss of many lives, especially those people who are suffering from other dangerous diseases such as diabetes and asthma (Morens & Fauci, 2020). To reduce the rate of spread of the Covid-19 disease most of the institutions such as schools and universities were closed. The economy of various countries globally was also negatively affected due to the closure of the air transport and declaration of the city of emergency which resulted in the loss of jobs and the decline in the production and distribution of products.

Covid-19 is has been a serious disease since 8, December 2020. There are various prevention strategies and control measures that have been put in place by relevant health bodies. Health care is a technical element at the global and local levels. One of the best health setting strategies is on the reduction of community spread of Covid-19. The reduction of

community spread of Covid-19 can be done through administering preventive vaccines.

Now that the Covid-19 disease significantly affects the respiratory system of humans, other forms of preventive measures will be wearing masks. The culture or habit of regularly putting on the face mask is essential as it protects a given person from getting into the contract the minute moisture that can come from a close person. Sanitization is very important since one of the proactive techniques that can be used to kill all forms of coronavirus on hands (Ding et al. 2020). The sanitizers consist of alcoholic content which destroys and kills the virus within the hands or the physical parts of the human body. Avoiding congested areas is also one of the precautions that individuals can take to prevent being infected by Covid-19 disease. When a large percentage of people accumulate in the small or squeezed area, there is a high possibility of an individual to get affected by the Covid-19. Avoiding unnecessary traveling to different regions is also one of the ways which can help in reducing the prevalence of the Covid-19 disease (Ding et al. 2020). On the other hand, Covid-19 has also resulted in the opening of new firms apart from the negative impacts that the pandemic has caused the economic progress of most of the countries. Most of the firms that have emerged due to the outbreak of the Covid-19 pandemic are the ones involved in the massive production of face masks. Now that face marks are an essential requirement as far as the reduction of the prevalence of Covid-19 is concerned.

Different techniques were also put in place by various health bodies of different states and also the world health organization. These forms of health techniques were implemented to diagnose and detect the presence of the covid-19 virus within the human body (Morens & Fauci, 2020). Some of these techniques include checking the body temperature using the relevant body thermometers, chest X-ray, high resolution computed tomography (HRCT), and other proposed methods. Hence, this particular study will put much focus on the impact of two main health techniques on Covid-19, that is the chest X-ray and high resolution computed tomography (HRCT). The investigation on the impact of high resolution computed tomography (HRCT) and chest X-ray will be done using a statistical technique of correlation analysis. The medical technique associated with chest x-ray has involved an image of the internal structure of humans using strong beans of light penetration. The Chest x-ray is essential as it is used in the chest diagnosis where the medical practitioners can study and understand the condition of the breathing system.

Hypotheses:

The formulation of the hypothesis or hypotheses will enable us to achieve the objective of this study. The objective of this study is basically on the relationship between the Chest X-ray and high resolution computed tomography (HRCT) on the covid-19 points. Therefore, it is necessary to formulate two sets of hypotheses in terms of the null hypothesis and the alternative hypothesis. Hence, the formulation of the two hypotheses are as follows:

1. **H_0**: The aspect to do with the chest X-ray has got a significant impact on the Covid-19 points. Verses, **H_1**: The aspect to do with chest X-ray does not have a significant impact on the Covid-19 points.
2. **H_0:** The aspect to do with the high resolution computed tomography (HRCT) has got a significant impact on the Covid-19 points. Verses, **H_1**: The aspect to do with the high resolution computed tomography (HRCT) does not have a significant impact on the Covid-19 points.

Statistical analysis:

Different forms of techniques will be applied to investigate the relationship between the chest X-ray and high resolution computed tomography (HRCT) and the Covid-19 points. The multiple and simple linear regression will be used on the SPSS file over the collected data. The regression model consists of the correlation value that is relevant to provide a clear conclusion on the relationship between the Chest X-ray, high resolution computed tomography (HRCT), and the covid-19 points. Therefore, this analysis will consist of two independent variables and one dependent variable. The independent variables of this research study will be the high resolution computed tomography (HRCT) and the aspects to do with the chest X-ray. On the other hand, the dependent variable of this research study will be the covid-19 points.

RESULTS AND DISCUSSION:

The distribution of the collected data is as shown below (ratings on both the dependent and independent variable lies from 0 to 100):

CHEST X-RAY	HRCT	COVID_19 POINTS
26	25	15
16	16	6
18	19	10
20	18	11
20	21	11
25	25	15
16	16	6
19	19	10
18	18	11
21	21	11
25	25	15
16	16	6
19	19	10
18	18	11
21	21	11
25	25	15
16	16	6
18	19	10
17	18	11
21	21	11
25	25	15
16	16	6
19	19	10
18	18	11
21	21	11
25	25	15
17	16	6
19	19	10
18	18	11
21	21	11
25	25	15
16	16	6
19	19	10
17	18	11
22	21	11
25	25	15
16	16	6
19	19	10
18	18	11
21	21	11

The outputs of the regression models on the relationship between the dependent (Covid-19 points) and the independent variables (Chest X-ray and HRCT) are as follows:

Table 1: Regression modeling on the relationship between Chest X-ray and Covid-19 points

Model Summary

Model	R	R Square	Adjusted R Square	Std. The error of the Estimate
1	.903[a]	.816	.811	1.26433

a. Predictors: (Constant), CHESTX_RAY

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	268.856	1	268.856	168.190	.000[b]
	Residual	60.744	38	1.599		
	Total	329.600	39			

a. Dependent Variable: COVID_19_POINTS
b. Predictors: (Constant), CHESTX_RAY

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.740	1.276		-4.499	.000
	CHESTX_RAY	.824	.064	.903	12.969	.000

a. Dependent Variable: COVID_19_POINTS

When considering the statistical output of the regression model in table 1, the value of Pearson's correlation is 0.903 (R = 0.903). This correlation value is above 0.7 thus implying that the aspect to do with chest X-ray has got a significant impact on the Covid-19 points.

Table 2: Regression modeling on the relationship between HRCT and Covid-19 points

Model Summary

Model	R	R Square	Adjusted R Square	Std. The error of the Estimate
1	.925[a]	.855	.851	1.12190

a. Predictors: (Constant), HRCT

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	281.771	1	281.771	223.866	.000[b]
	Residual	47.829	38	1.259		
	Total	329.600	39			

a. Dependent Variable: COVID_19_POINTS
b. Predictors: (Constant), HRCT

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-6.577	1.162		-5.662	.000
	HRCT	.868	.058	.925	14.962	.000

a. Dependent Variable: COVID_19_POINTS

The statistical output of the regression model in table 2, shows that the value of Pearson's correlation on the relationship between the high resolution computed tomography (HRCT) and Covid-19 points are 0.925 (R = 0.925). This correlation value is also above 0.7 (R = 0.925 > 0.5) which implies that high resolution computed tomography (HRCT) has got a very significant impact on the Covid-19 points.

CONCLUSION:

The key objective of this particular research is to investigate the relationship between the chest X-ray and high resolution computed tomography on Covid-19 disease. It was therefore necessary to carry out correlation analysis to explore the impact of chest X-ray and HRCT on the detection and cure of the Covid-19 pandemic disease. Covid-19 is a pandemic disease associated with chest and breathing problems in humans. This pandemic disease emerged in China in November 2019. The disease has negatively affected the daily life endeavors of individuals globally in terms of economic, social, and political affairs.

As per the recent medical research, the chest X-ray is a practice that is necessary to check and diagnose the chest status of a given individual. Hence, the research on this particular study will also put much focus on the impact of the chest X-ray as far as the detection and treatment of Covid 19 is concerned.

The first case of Covid-19 was discovered by the health officials in Wuhan city in December 2019 in China. The Covid-19 disease was subsequently named SARS-Cov-2. A considerable number of the earlier cases of Covid-19 had been attached to the wholesale food supply in Wuhan city. A significant number of the initial patients of covid-19 were either regular visitors to the Wuhan market, stall owners, or the market employees. A huge percentage of the environmental samples obtained from the Wuhan market in December 2019 tested positive for Covid-19. Therefore, these stipulated reasons provide sufficient evidence to conclude that the Wuhan city in China was the source of the outbreak of the Covid-19 pandemic disease.

Hence, as per the conducted statistical analysis in table 1, the values of the Pearson's correlation provides sufficient evidence to conclude that the practice to do with chest X-ray has got a significant impact on the Covid-19 points. On the other hand, the results of the regression modeling in table 2 also provide sufficient evidence to conclude that the aspect to do with high resolution computed tomography (HRCT) has a significant impact on the covid-19 points. There is the existence of a significant impact between the dependent variable and the independent variable since the value of Pearson's correlation is above 0.5.

Authors' contribution

1. General understanding of covid-19 pandemic in relation Chest X-ray and HRCT
2. Data collection and methodology
3. Data analysis and interpretation
4. Conclusion of the research

REFERENCES:

1. Cozzi A, Schiaffino S, Arpaia F, Della Pepa G, Tritella S, Bertolotti P, Menicagli L, Monaco CG, Carbonaro LA, Spairani R, Paskeh BB. Chest x-ray in the COVID-19 pandemic: Radiologists' real-world reader performance. European Journal of Radiology. 2020 Nov 1;132:109272.
2. Lins M, Vandevenne J, Thillai M, Lavon BR, Lanclus M, Bonte S, Godon R, Kendall I, De Backer J, De Backer W. Assessment of small pulmonary blood vessels in COVID-19 patients using HRCT. Academic radiology. 2020 Oct 1;27(10):1449-55.
3. Morens DM, Breman JG, Calisher CH, Doherty PC, Hahn BH, Keusch GT, Kramer LD, LeDuc JW, Monath TP, Taubenberger JK. The origin of COVID-19 and why it matters. The American journal of tropical medicine and hygiene. 2020 Sep 2;103(3):955-9.
4. Vadivasova TE, Strelkova GI, Bogomolov SA, Anishchenko VS. Correlation analysis of the coherence-incoherence transition in a ring of nonlocally coupled logistic maps. Chaos: An Interdisciplinary Journal of Nonlinear Science. 2016 Sep 15;26(9):093108.

5. Ding W, Levine R, Lin C, Xie W. Corporate immunity to the COVID-19 pandemic. National Bureau of Economic Research; 2020 Apr 23.
6. https://www.researchgate.net/publication/344392132_Impact_of_the_COVID-19_Pandemic_Evidence_from_the_US_Restaurant_Industry
7. Hamid S, Mir MY, Rohela GK. Noval coronavirus disease (COVID-19): A pandemic (Epidemiology, Pathogenesis and potential therapeutics). New Microbes and New Infections. 2020 Apr 14:100679.
8. https://www.researchgate.net/publication/342716535_Coronavirus_Disease_COVID-19_Pathogenicity_Transmission_Epidemiology_Diagnosis_Case_Management_and_Public_Health_Response
9. Morens DM, Fauci AS. Emerging pandemic diseases: How we got to COVID-19. Cell. 2020 Aug 15.
10. https://www.researchgate.net/publication/343681275_Emerging_Pandemic_Diseases_How_We_Got_to_COVID-19