# The influence of quality of adult thorax photos on the satisfaction level of radiology doctors with computed radiography in radiological installation of Panembahan Senopati Hospital Bantul

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### Abstract

*This study aims to determine the effect of adult thorax photo quality on the satisfaction level of Radiology Doctors and to determine the dominant factors that influence the satisfaction level of Radiology Doctors. Type of this research is quantitative with a survey approach. The sample was consisted of 144 thorax photos. Data analysis was carried out descriptively and multiple regression by testing the regression line hypothesis, statistical f test, statistical t test, and coefficient of determination. The results showed that there was an influence on the quality of the radiograph with the Radiology Doctor's satisfaction. The significance value of the density is 0,048, the value of the contrast significance is 0,002, the significance value of sharpness is 0,001 and the value of the detail significance is 0,020. While the dominant factor is the sharpness variable.*

*Keywords: Radiology Doctor satisfaction, radiograph quality, thorax photo*

## INTRODUCTION

Satisfaction is defined as the level of satisfaction of a person after comparing perceived performance or results compared to his/her expectations (Kotler, 2012). According to KEPMENPAN No. KEP/25/M.PAN/2/2004, the minimum elements that must be present for the basis of the satisfaction index are service procedures, service requirements, clarity of medical service personnel, discipline of officers, responsibility of officers, capability of officers, speed of officers and fairness of obtaining services.

The quality of radiograph certainly gives satisfaction to the Radiology Doctors. This brings several advantages, for example Radiology Doctors will determine the diagnosis for patients more clearly. The radiograph is said to be of high quality if he/she has all the information needed to establish the diagnosis. Quality aspects assessed on a radiograph are density, contrast, sharpness and detail (Rahman, 2009).

Based on the data in the Radiology Installation, the Regional General Hospital (RSUD) Panembahan Senopati Bantul, there are several rooms, namely conventional examination, panoramic examination room, ultrasound examination room, fluoroscopy examination room, and CT scan room. In October 2017, the average number of patients who visited the Radiology Installation every day was about 40 people. They were consisted of 24 conventional examinations, 10 ultrasound examinations, and 6 CT scans. On the conventional examination most patients taken adult thorax examinations as many as 18 patients.

According to Merrill's et al. (2011) Thorax radiographic examination one of which is used is projection of PA with the patient standing, the direction of the beam perpendicular, the point of view in the MSP as the angle of the inferior scapula or as high as the thoracal vertebra of seven. FFD 183 cm, using 35x43 cm cassette and grid. Each projection uses one film.

Computed Radiography is the process of image digitization using photostimulable plates for image data acquisition, several advantages over conventional radiographs for thorax examination (Papp, 2006), namely: lower repetition rates due to technical error, higher contrast resolution, latitude, no need dark room, image quality can be improved, image illumination is easier. Computed Radiography is a tool for processing radiographs after being exposed. According to Carmichael et al. (2006) the quality of a good radiograph for adult thorax examination was assessed from the film density being able to (discolor) the lungs, film density capable of (blackening) mediastinum, sharpness, proper collimation limits, acceptability of the film.

At the Radiology Installation in Panembahan Senopati Hospital Bantul, Thorax examination with PA projection used an X-ray plane, a 35x43 cm cassette was processed using Computed Radiography. However, when printing CR films using a size of 35x43 cm it was used for 2 radiographs in different patients. The quality of the radiograph image decreases and allows the diagnosis given to the patient to be less accurate.

## RESEARCH METHODS

This research uses quantitative research method with a survey approach (Sugiyono, 2011). The population in this study were all patients examining adult thorax photos in January 2018 totaling 225 people. The samples in this study were adult thorax photo patients who met the inclusion criteria of 144 people. Analysis of this research data using descriptive and multiple regression analysis.

## RESULTS AND DISCUSSION

The results of the study that the author did about the effect of density variables with the satisfaction of Radiology Doctors in the radiology installation of Panembahan Senopati Hospital Bantul showed $0,048 < 0,05$ there was an effect between density and satisfaction of radiology doctors. The factors that influence the density of adult thorax photos at Radiology Installation of Panembahan Senopati Hospital Bantul are setting of patient's position, setting of exposure factor, and using optimization.

According to Pongnapang (2005), good density settings in Computer Radiography are influenced by the use of high kV techniques, thereby reducing optimization on radiograph quality. The high use of kV with an increase in radiation dose in patients has a signal to noise ratio and a better low contrast detectability on imaging plates. This is contrary to the ALARA principle (As low as Reasonably Achievable)

This is consistent with the author's opinion that the density of the radiograph film affects the satisfaction level of Radiology Doctors at the Radiology Installation of Panembahan Regional Hospital Bantul. If all the factors that affect the density in the radiograph and there is no repeat, the quality of the radiograph will be optimal so that it will lead to satisfaction of Radiology Doctors.

The results of the study the authors did about the effect of contrasting variables with the satisfaction of radiology doctors at Panembahan Senopati Hospital Bantul

showed the results of 0,002 <0,05 there was an influence between the contrast to the satisfaction of Radiology doctors, the factors influencing contrast in adult thorax photos in Radiology Installation of Panembahan Senopati Hospital Bantul factor of exposure, object thickness and optimization use.

According to Pongnapang (2005), good contrast is affected by the accuracy of the object's position in the middle of the cassette, the proper collimation so that it will affect noise and scatter radiation. This is also reinforced by Williams (2007) that contrast is influenced by imaging plate, material subject and receptor sensitivity. Material subjects are target material, kV and total beam filtration. If these factors are achieved, the quality of the radiograph will be good so that it affects the level of satisfaction of Radiology Doctors.

This is in accordance with the author's opinion that the contrast on film radiographs affects the level of satisfaction of Radiology Doctors at the Radiology Installation of Panembahan Senopati Hospital Bantul. If all the factors that affect the contrast in radiography are reached and there is no repeat, the quality of the radiograph will be optimal so that it will lead to satisfaction of Radiology Doctors.

The results of the study that the author did about the effect of sharpness variables on the satisfaction of radiology doctors at Radiology Installation of Panembahan Senopati Hospital Bantul showed that after multiple regression analysis the results of Sig. 0,001 <0,05 there is an effect of sharpness on the satisfaction of Radiology Doctors. The factors that influence the sharpness of adult chest radiographs at the Radiology Installation at Panembahan Senopati Hospital Bantul are setting of exposure factor, object thickness and FFD.

These results are consistent with Williams (2007), poor acuity caused by focal spot factor X-ray tube, light diffusion in receptors, effective aperture size, patient movement to X-ray sources, thickness of objects and image receptors. If these factors are maximized, the quality of the radiograph will be improved so that it affects the satisfaction level of the Radiology Doctor. This is in accordance with the author's opinion that the sharpness of the radiographic film affects the level of satisfaction of Radiology Doctors at the Radiology Installation at Panembahan Senopati Hospital Bantul. If all the factors that affect the sharpness of the radiograph are reached and there is no repeat, the quality of the radiograph will be optimal so that it will lead to satisfaction of the Radiology Doctor and to improve the quality of sharpness on radiography with periodic maintenance from the vendor to the Computed Radiography (CR). The results of the study that the author did about the influence of the detailed variables on the satisfaction of Radiology Doctors at the Radiology Installation at Panembahan Senopati Hospital in Bantul showed that after multiple regression analysis, the results of Sig. 0,020 <0,05 there is an influence between the details of the radiology doctor's satisfaction. The factors that influence the details of adult chest radiographs at the Radiology Installation at Panembahan Senopati Hospital in Bantul are the size of the film and imaging plate.

This is in accordance with Williams (2007), good detail is influenced by two factors, namely the process of spreading X-Ray-to-light conversion photon light and imaging plate size, if these factors are achieved it will cause a good quality radiograph that affects the level of radiology doctor satisfaction. This is in accordance with the author's opinion that the details on the film radiograph affect the level of satisfaction of Radiology Doctors at the Radiology Installation of Panembahan Senopati Hospital Bantul. If all the factors that affect detail in radiography are reached and there is no

repeat, the quality of the radiograph will be optimal so that it will lead to satisfaction of the Radiology Doctors. The most dominant factor that influences the level of satisfaction of Radiology Doctors is sharpness variable. At the Radiology Installation, Panembahan Senopati Hospital, Bantul, at the time of exposure, it used a 35x43 cm cassette size, but when printing using 35x43 size it was divided into two projections with different patients so that the sharpness decreased and can be seen in the regression line equation where the largest regression coefficient is 0,232.

This is consistent with Williams (2007), poor acuity caused by focal spot factor X-ray tubes, light diffusion in receptors, effective aperture size, patient movement to X-ray sources, thickness of objects and image receptors. If these factors are maximized, the quality of the radiograph will be improved so that it affects the satisfaction level of the Radiology Doctor.

This is consistent with the author's opinion that the sharpness of the film affects the level of satisfaction of radiology doctors at the Radiology Installation at Panembahan Senopati Hospital, Bantul. If all the factors that affect sharpness in radiography are achieved and there is no repeat, the quality of the radiograph will be optimal so that it will lead to satisfaction of the Radiology Doctor. It is better to do further research on thorax photo criteria using Computed Radiography (CR) because only 34,2% of the dependent variable (radiology doctor satisfaction) is influenced by the independent variables (Density, contrast, sharpness, and detail). Meanwhile, the remaining 65,8% is influenced by other variables that lead to criteria in radiographs.

## CONCLUSION

There is an influence between the quality of density and the satisfaction of radiology doctors with a significance value of 0,048 <0,05. There is an influence between contrast quality on the satisfaction of radiology doctors with a significance value of 0,002 <0,05. There is an influence between the quality of sharpness to the satisfaction of radiology doctors with a significance value of 0,002 <0,05. There is an influence between the quality of detail on the satisfaction of radiology doctors with a significance value of 0,020 <0,05. The dominant factor influencing the satisfaction level of radiology doctors at the radiology installation of Panembahan Senopati Hospital Bantul is quality of sharpness variable.

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