



Evaluation assessment of effective communication pattern for maintaining the image quality:A patient survey-based study.

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Abstract: **Background:** effective communication skills are necessary for establishing and maintaining effective relation between radiographer and patient. Communication skills are a core element in medicine, nursing and allied health. Effective communication skills prevent misunderstanding between patient and healthcare practitioner.

Aim: The main aim of this study is to identify the cause of image retake.

Method: A patient based survey has been conducted in radiology department for evaluation of effective communication skill, total(n=80) patients of different age group were included in this study.

Result: Effective communication pattern was categorised as 1. Greeting and introduction, 2. History taking, and 3. And procedure explaining. The study has been completed by comparing the data obtained from pre-and post-assessment. Patient experience in radiology department improve after guideline introduction but has negligible effect on image quality.

Discussion: As observed in this study, the image artifacts before guideline introduction was 55%, the image artefacts had not been significantly reduced from 55% to 52.5% 1 months after introduction. Increase workload in radiology department was a serious stress factor which often led to sub-optimal communication between patient and radiographer. It was observed that time constraint is common in radiology department, more time is needed for healthy communication.

Conclusion: Proper handling of imaging equipment and QA/QC programme are necessary to obtain good image quality.

Key words: Effective communication,QA/QC,health care practitioner, Radiodiagnosis, vital sign.

I. INTRODUCTION

In the radio diagnosis facility, communication between patient and healthcare professionals is one of the most important aspect which helps in maintaining imaging standards, allow smooth functioning and improve department workload. Effective communication adheres the patient with radiographer before and after the examination results in decrease post procedure complication and improvement in technical success. It has been reported that effective patient-radiographer communication can improve vital sign, reduce stress level and emotional burnout. In the hustle and bustle of radiology department, it is difficult for a technologist to allocate more than 5 minute to each patient. Establishment of effective communication between patient and practitioner is difficult to achieve in busy healthcare. Fleeting interaction also limit the exchange of extensive information. This mean that the radiographer has to build harmonio relationship and trust in short time.

REVIEW OF LITERATURE

1. **N. Pollard et al.** conducted a study on **Patient perceptions of communication with diagnostic radiographers** in 2018 which published online in 2019. The aim of study was to examine the perspective of patient regarding patient-radiographer communication and impact of communication on patient-radiographer relation. Data were collected after examination of patient(n=10) which is based on semi-structured interview and then analysis using inductive method. Based on researcher analysis, five theme were identified. These were Introduction and Greeting, Explanation/Instruction, Feeling at ease, Clear communication and Gentle manner. Author advocate that communication is important as different profession require different communication skills. This study proves that communication is not limited to greeting and introduction themselves to patient. Effective communication result in patient confidence, comfort and satisfaction.

2. **Lisa A. Booth and David J. Manning** conducted a study based on **Observations of radiographer communication: An exploratory study using Transactional Analysis**, 2006. The author addresses the necessity of different style of communication if a radiographer wants to achieve an optimal image quality. This study is based on transactional analysis which has been previously done with validity and reliability. According to the transactional analysis theory develop by psychologist Eric Berne in 1960s, an individual personality express 3 ego state namely parent, adult and child. It is observed that use of transactional approach may help in dealing with patient.

3. A qualitative study was done by **Syazwin Binti Husain. Mammography: effective communication of radiographer toward patients**. Published online 10th June, 2015. The aim of this is to access the confidence level of radiographer toward patient during mammography examination. Communication between patient and radiographer was deemed to be neglected area of study. The author of this study made a judgement that mutual understanding between them can be achieve with implementation of effective communication of radiographer.

4. **Peter Miller et al.** conducted a qualitative study on **Enhancing Patients' Experiences in Radiology: Through Patient–Radiologist Interaction** which was basically a patient based survey study whose aim is to evaluate the patient perspective on role of radiologist in their care. Patients were divided into two group, the first group who meet with radiologist and second group of patient who did not meet with radiologist. The radiologist was provided with script which was later explained to the patient before examination. Nearly 50% of patients do not know that a radiologist is a physician and 2/3 of patients do not understand well the role radiologists play in their care.

5. **“Quality Improvement in Radiology: Basic Principles and Tools Required to Achieve Success”** is a study which was performed by **Jonathan B. Kruskal et al.** in 2011. According to this study Quality improvement is a mandatory process require careful, dedicated, and continuous effort by skilled team members. Radiology staff must familiar with the basic tools and methodology of quality improvement. It improves the clinical and technical success with superior staff and patient care. A patient based survey definitely helps us to find out the cause of problem when the organisation concerned about patient safety and comfortable. A healthcare professional should not accountable for all errors because system error become not uncommon with ageing of modality

6. **David B. Larson and L. Jake Mickelsen** carried out a study on **Project Management for Quality Improvement in Radiology** at Department of Radiology, Stanford University School of Medicine in 2015. This article outlines the importance of applying project management principles to improve quality standards in radiology. Quality Improvement Project helps in achieving consistency in higher performance for longer period of time. The process begins with an idea of improving certain aspects which should be better than they currently are. Then prioritization of projects is based on feasibility and availability of resources. Role of participant, leader, coach and sponsor is deemed as an essential part of project which are responsible for the success of project. Need for project management increase with increasing complexity and use of advance technology in radiology department to provide best service to his patient.

OBJECTIVES

1. To improve the radiographic image quality .
2. To provide supportive environment for patient through explaining radiographic procedure.
3. To improve the radiographer communication skill .

Method and materials:

Sample Size: This was a patient survey based study in which 80 patients of various age group were included.

Study Design: It was a qualitative and survey based study on patients that underwent X- ray examination within the given period.

Study Duration: This study conducted at time period of 1 year in department of radio diagnosis & imaging at SGT hospital.

Sample Collection Duration: : Sample collected from 1st November 2020 to 31st may 2021.

Study Area: The patients coming to SGT hospital was taken for the study.

Data Collection: Data collected from the patients who underwent x-ray examination and their corresponding radiographic images were collected from CR room in the radiology department in SGT hospital research Institute Gurugram, Haryana.

Results of the study:

1. Improvement in communication pattern

As shown in fig.5.1 40 patients were evaluated before the guideline introduction, among 40 patients, 33(83%) patients denied that they were greeted or radiographer introduce himself when they visited radiology department. The remaining 7(17%) patients claimed that radiographer introduce himself before proceeding the examination. In fig. 5.2, again 40 patients were evaluated and significant improvement in communication has been seen after purposing the guidelines. It can be found that radiographer improve their communication pattern. Percentage of patients who were greeted increases from 17% to 73%.

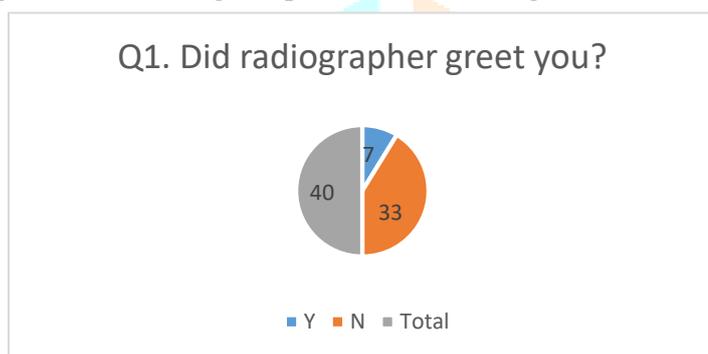


fig.5.1 weightage of “Y” and “N” in pre- assessment study

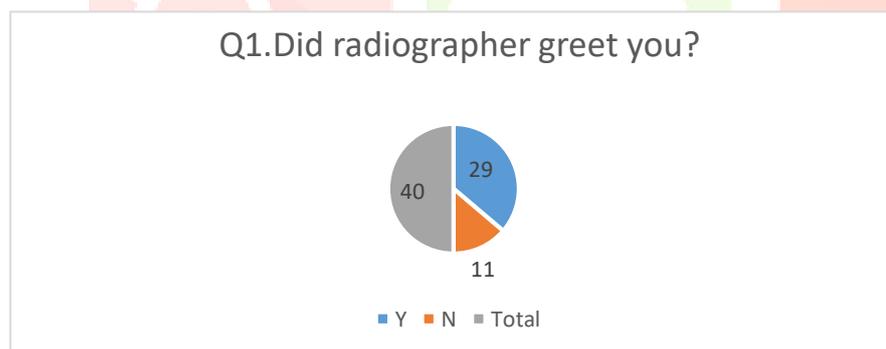


Fig.5.2 weightage of “Y” and “N” in post assessment study

In fig.5.3 and 5.4 both demographic variable (age and sex) of patients are represented, major portion of respondents lie in age group (25-45) in both pre and post assessment study. Relationship between type of examination and patient’s instruction given by radiographer with pre and post assessment comparison is shown in fig.5.5. In pre-assessment study, 95.2% patients in thorax imaging, 75% in spine imaging, 100% in abdomen imaging and no patients in lower limb, upper limb and pelvic imaging were instructed before examination. In post assessment study, 100% patients in pelvic, thoracic and abdomen imaging were instructed before examination.

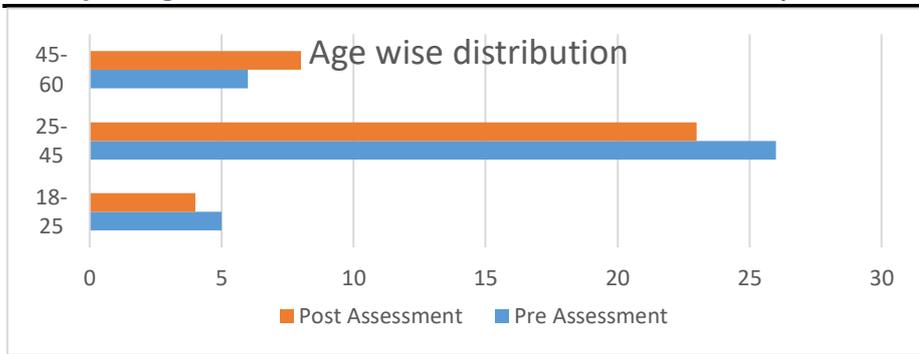


Fig.5.3 distribution of different age group in pre and post assessment.

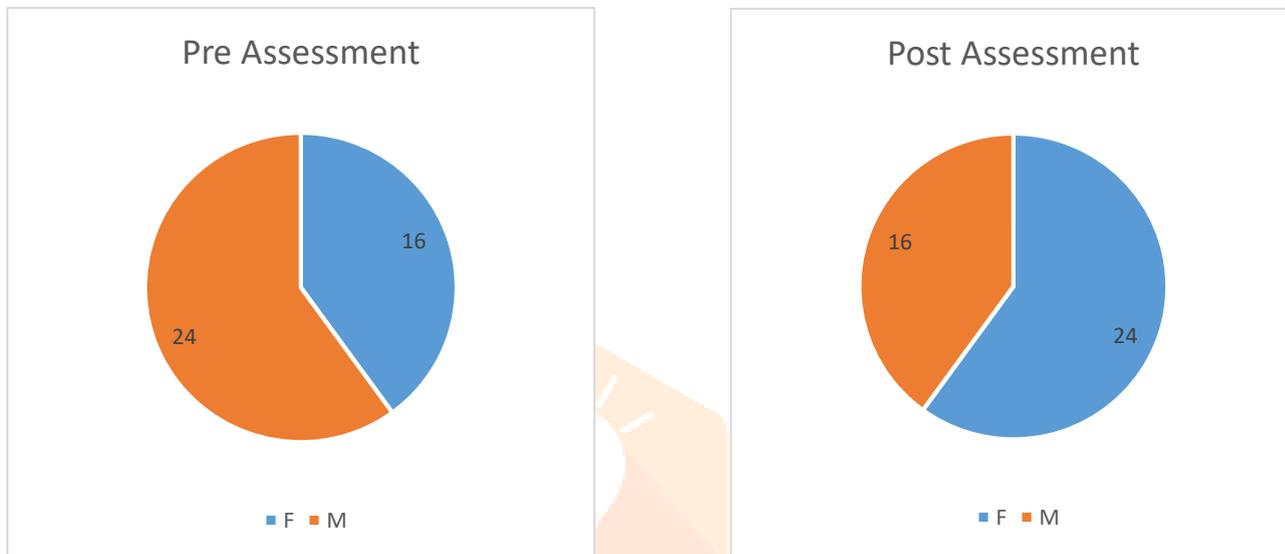


Fig.5.4 shows the number of female and male patients in pre and post assessment study.

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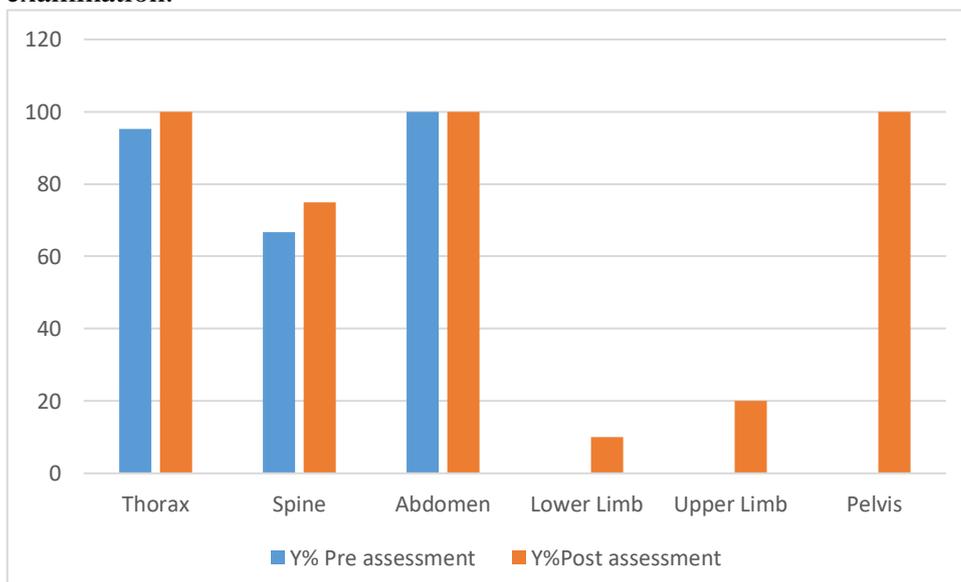


Fig.5.5 shows how frequent radiographer explaining procedure in different type of examination.

A rating feedback has been taken from patients which reflect the radiographer’s communication skills, voice tone, and behaviour. It can be easily seen in fig.5.6. that patient experience with radiographer significantly improve.

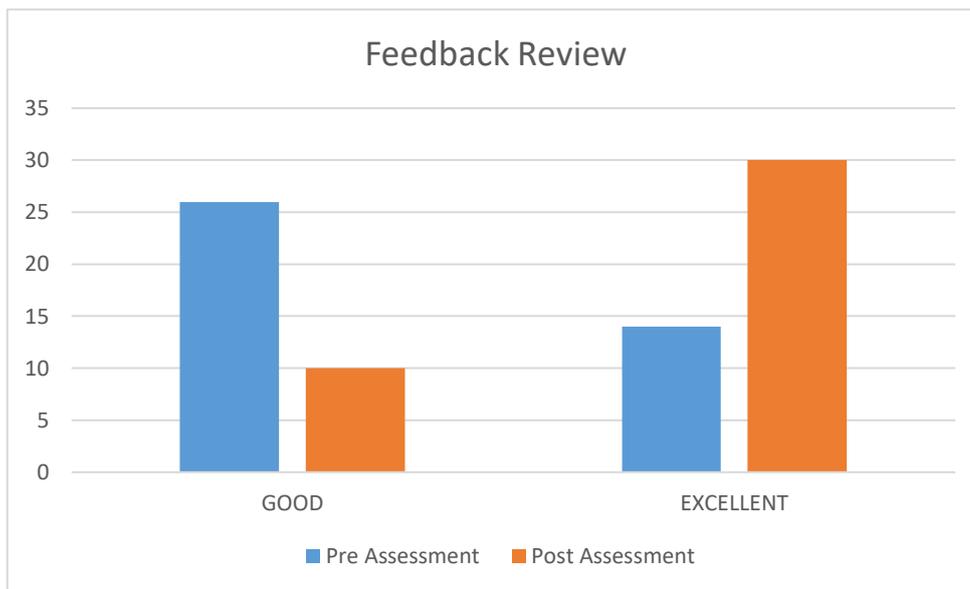


Fig.5.6 patient feedback

2. Proposed guidelines for improving communication pattern and image quality

As shown in Table 5.1, in order to improve the communication pattern and images with good quality for reducing image artifacts, guidelines were proposed for technicians to tell each and every instruction clearly to patient for preparation and posting at proper sites in the dressing rooms to request patients to remove artifacts. It also helps in reducing patient anxiety regarding examination.

In Figure 5.5. the percentage of examination is provided for each examination type. In both cases, the dominant type of examination was found to be chest x-ray. Similarly, the largest cassette size(14x17inch.) most prominently used in both pre and post assessment study.

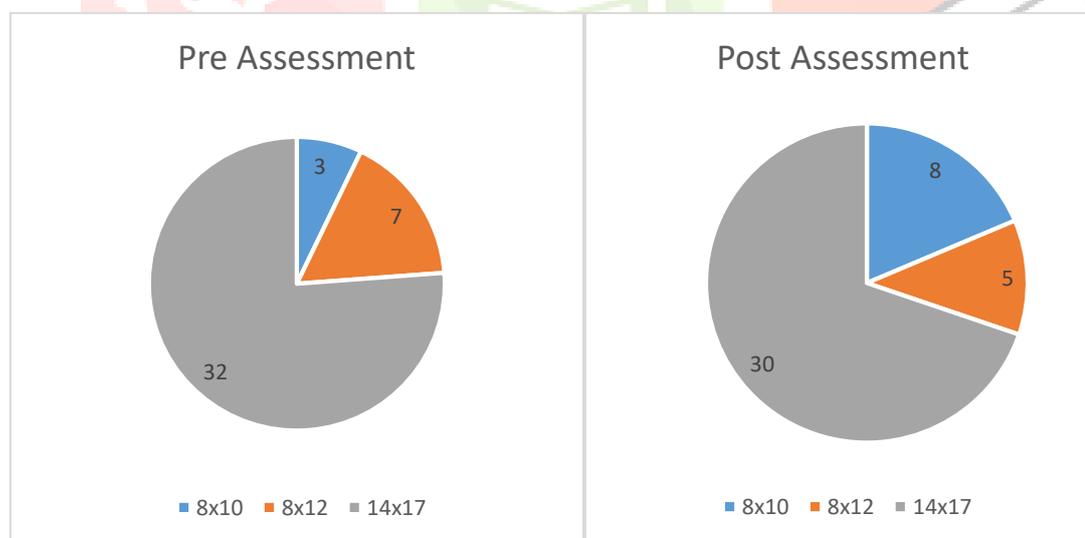


Fig.5.7 frequency of different cassette size used in examination.

Table 5.1. Image artifacts rates for factors affecting image retake before and after guideline introduction.

| Factor | Before guidelines introduction | | after guidelines introduction | |
|-------------------|--------------------------------|------|-------------------------------|------|
| | n= 22(55%) | N=40 | n=21(52.5%) | N=40 |
| PSP plate damaged | 14 | | 16 | |
| Roller artifact | 4 | | 3 | |
| Motion artifacts | 0 | | 0 | |
| Metallic artifact | 4 | | 2 | |

As shown in Table 5.1, among the 40 images used for analysis, 22 image before the guideline introduction and 21 images after the guideline introduction with different type of artifacts were observed. PSP plate damaged was the most frequent factor causing image retake, followed by roller artifact and metallic artifact. Fig.5.8 shows the frequency of image artifact on different type of cassette size. In both scenario, artifacts were most frequently observed on largest(14x17inch) cassette size.

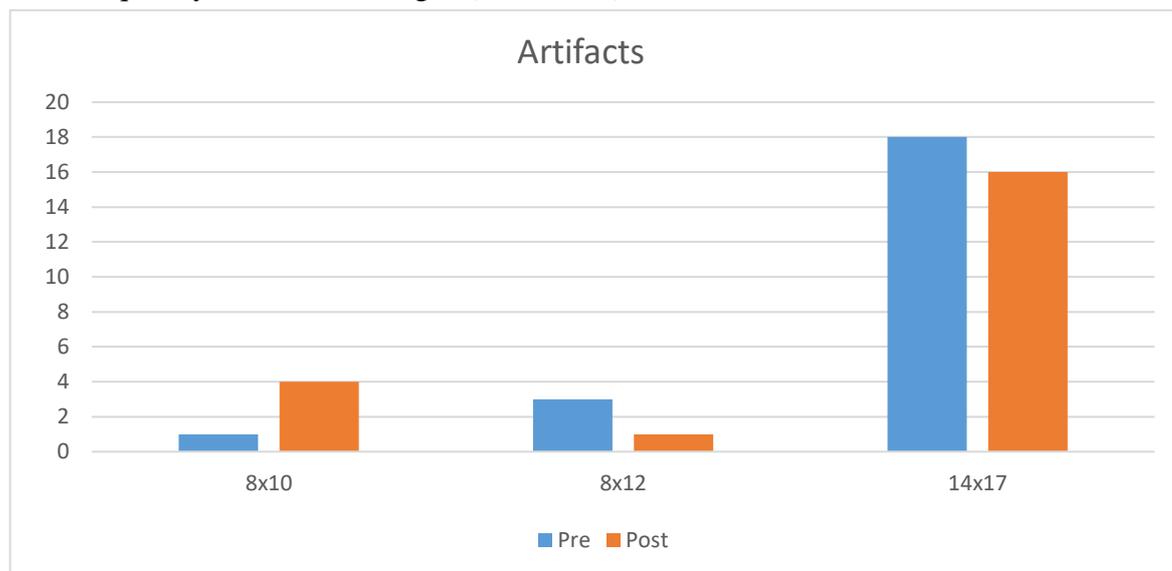


Fig. 5.8 shows the frequency of image artifacts on different cassette size

Discussion

As observed in this study, the image artifacts before guideline introduction was 55%, the image artefacts had not been significantly reduced from 55% to 52.5% 1 months after introduction. Increase workload in radiology department was a serious stress factor which often led to sub-optimal communication between patient and radiographer. It was observed that time constraint is common in radiology department, more time is needed for healthy communication. Among the image artifacts, PSP plate damage artefact (63.3%) is the most frequently observed factor, which remained consistent to the findings reports even after guideline introduction. Possible solutions for reducing radiographic image artifacts are to provide seminars for less experienced technicians to increase their knowledge and communication skills. By actively using processing algorithm, advance software such as computer aided detection, image quality can be improved with improve patient care. Medical imaging facilities must require to maintain the highest quality and consistency of patient care while maximizing efficiency, productivity, and profitability.¹ The main objective of Guidelines 3 and 4 were applied to reduce the image retakes caused by artifacts and body movements, respectively. Notably, as presented in Table.5.1 the metallic artifacts due to improper patient preparation exhibits no changes. Among the different cassette sizes, largest size (14x17inch) cassette was most frequently used for examination and highest frequency of image artifacts also seen on largest cassette size. In fig.5.5, it has been observed that radiographer effectively explain those examinations which involve instruction related to inspiration and expiration such as thorax, abdomen, spine and pelvic. Similar to the previous study, thoracic radiography was the most frequent examination.² Rest of the examination were not frequently explained by radiographer such as upper and lower limb radiography. In some examination patient's comments to radiographer are important. When contrast medium is injected, some side effect can be expected. In most straightforward examination, such as plan radiography of limbs require minimal oral communication. Guideline are needed to give satisfactory healthcare to patient by describing medical terminology and radiology methods. In this study, guideline 1 and 2 were specifically proposed to improve the communication skills of radiographer. In fig.5.1 and 5.2, it can be found that patient interaction with radiographer improve with basic introduction. Patients feedback review also improve after guideline introduction. Film reject analysis is deemed as a potential QA programme in modern facilities. Quarterly analysis of radiographic images is able to find factors causing retake and useful for generating further guidelines for improving image

retake. A QA sub-specialist, who will monitor the productivity and economic gain of fresher technician and help them in improving their skills without sacrificing image quality and patient safety.

Conclusion:

After analysing the radiographic images in pre and post assessment study for different cause of image retake. It was observed that effective communication pattern has negligible effect on radiographic image quality but significantly improve radiographer communication skills and patient experience in radiology department. Majority of image artifacts is due to equipment malfunction. The quality of radiographic images depends upon equipment and dexterities of operators. The QA/QC programme must run quarterly in radio-diagnosis facilities to find the cause of image retake. This study was limited by the absence of exposure technique corresponding to the type of examination. Future studies could investigate the association between patient body habitus, patient medical condition and exposure technique necessary to obtain good quality radiograph.

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