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Efficacy of musculoskeletal injuries among endoscopists and the impact of variables spent on procedures

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ABSTRACT

According to previous research, endoscopists often suffer from musculoskeletal injuries (MI). There is little evidence from many nations. Endoscopists often experience physical stress, which may cause musculoskeletal issues. Work-related musculoskeletal diseases have gained attention due to the growing complexity of interventional endoscopy and the lengthened examination times. Data on endoscopists' health stress at work, however, is hard to come by. Therefore, the aim of this research was to look at the effects and incidence of work-related musculoskeletal problems among endoscopists. The purpose of the research was to evaluate, in a nationally representative population, the incidence of self-reported endoscopy-related injuries, injury patterns, and endoscopist awareness of prevention interventions. A questionnaire on musculoskeletal illnesses related to endoscopy and standardised pain evaluation was created and data was collected from endoscopic staff of multispecialty hospital in national capital region.

Relevant risk variables for musculoskeletal health problems have been identified as being age, professional experience, and work hours. The findings revealed that the participants had a mean professional experience of 21.0 years and had an average daily working time of 8.2 hours in the endoscopic facilities. The dominant hand utilised in endoscopic operations is the right hand (n = 134; 89.33%) rather than the left (n = 9; 6%). Due to certain working postures and repeated actions that have a significant negative influence on one's health, a big percentage of endoscopists suffer from musculoskeletal problems. To enhance the prevention of risk of the endoscopic activity, further interventional investigations are necessary.

Keywords: *Endoscopy, Musculoskeletal injuries*

INTRODUCTION

Musculoskeletal injuries are a significant global health concern having a high effect on the disability-adjusted remaining life, years of the life lost, and the decades lived with disabilities as well as rising economic and global significance (Sebbag et al., 2019).

Since musculoskeletal problems are so important for work-related health, practising endoscopists are known to be more vulnerable (Villa et al., 2019; Epstein et al., 2018). Numerous variables that predispose endoscopists to musculoskeletal diseases have previously been identified. Particularly, the foundation for overuse-related

health problems is the interaction of repeated movement and excessive treatment volume (Ridtitid et al., 2015; Shergill et al., 2009).

The diagnostic and treatment processes expose endoscopists and personnel to possible health risks. Radiation, exposed cables, body fluids, musculoskeletal injuries, and infectious materials are a few of them. To ensure that endoscopy staff are protected from these risks, strict adherence to safety standards and practises must be practised (Banerjee et al., 2008).

Because of this, it may be predicted that high-volume endoscopists may experience an increase in work-related musculoskeletal health disorders as a result of the growing complexity of endoscopic procedures and the inadequate ergonomic environment.

Additionally, infectious agents may be transferred to nearby tissues during operations or may be transmitted from patients to endoscopic staff during such procedures (Banerjee et al., 2008). Gastroenterologists are susceptible to overuse problems like the carpal tunnel syndrome, lateral epicondylitis and De Quervain's tenosynovitis because of the repetitive motion and the lengthy uncomfortable postures involved with endoscopy (Sheth and Jordan, 2010). But ergonomics still receives little attention in gastro-endoscopic procedures.

Other researches have highlighted incidents that resulted in the musculoskeletal injuries, such as crushing a hand against a doorway while transporting a patient, hitting the head on the mounted monitors, slipping and falling on wet floors, spraining the wrist and back when breaking a fall, tripping over the exposed wires, oxygen tubing and cords (Cappell, 2010). Additionally, it is projected that endoscopic-related musculoskeletal injuries cause an average of 6 missed workdays and 9 restricted workdays (Cappell, 2011). Therefore, it is important to ensure that endoscopic staff, patients, and hospital systems all practise optimal ergonomics.

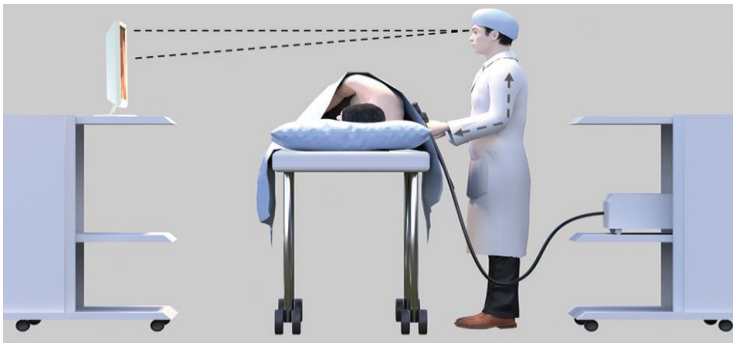

FIGURE 1: Demonstration of monitor schematically placed in front of endoscopist, with the patient table's height adjustable to lessen strain on the arms, back, and neck (Ofori et al., 2018)

FIGURE 2: A gastroenterologist doing endoscopic operations while standing (A) or sitting (B) and wearing appropriate personal equipment (Ofori et al., 2018)

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In addition, ergonomic testing is essential to preventing endoscopic injuries. Repetition, protracted uncomfortable postures, strong pressures, contact stress, and vibration are risk factors for strain injuries (Cohen et al., 2006).

According to survey-based research, the prevalence of musculoskeletal problems varies between 38% and 89%, with thumb, hand, neck, and back pain being the most often reported symptoms (Byun et al., 2008; Hansel et al., 2009; Keate et al., 2006). Our goal was to look at the health risks connected with the gastroenterologist's line of work and evidence-based strategies that might be used to reduce exposure or injury.

MATERIALS AND METHOD

The endoscopic staff of multispecialty hospital in national capital region. The study's primary tool was a questionnaire that was administered over the course of 1 year from January 2022 to 2023. For this research, a more sophisticated version of a health survey instrument was employed to determine the 150 respondents' overall health condition. For the current investigation, a musculoskeletal questionnaire was also used. Before being used, the questionnaire created for the purpose underwent validation. The closed-ended questions were included in the survey.

Ethical consideration

All the experts identified were given an information letter explaining the purpose of the study along with the consent form.

Statistical analysis

All collected data were analysed using SPSS version 15.0 software. All categorical data were summarised using frequency and proportion. The health issues for work-related musculoskeletal injuries were analysed using a univariate logistic regression model. Using multivariate logistic regression, the independent risk was analysed.

RESULT AND DISCUSSION

TABLE 1: Different features of endoscopist

Characteristic	Mean ± SD	Range
Age (years)	50.4 ± 10.4	28–80
Height (cm)	159.0 ± 9.1	151–200
BMI (kg/m2)	25.8 ± 3.1	17.8–42.2
Weight (kg)	76.9 ± 12.8	49–122
Professional experience (years)	25.0 ± 10.1	5–46
Working time in endoscopy (hours/day)	8.2 ± 2.1	1–12
Number of endoscopic examinations per week (total)	86.4 ± 38.3	14–198
ERCP	32.1 ± 17.1	5–105
Diagnostic	23.6 ± 11.6	5–70
Therapeutic	8.6 ± 7.6	0–35

The characteristics of endoscopist age is nearly 50.4 ± 10.4 and body mass index (BMI, 25.8 ± 3.1). On average, they spend 8.2 ± 2.1 hours per day of the working hours in the endoscopic work. When comparing the endoscopists who showed with Endoscopic retrograde cholangiopancreatography (ERCP) is 32.1 ± 17.1 and the ones who did not, there has been no significant difference in the duration of the procedure in either of the group when performing same procedure.

TABLE 2: Different variables of injuries while performing endoscopy

Characteristic	Frequency (n = 150)	Percentage (%)
Sex		
Male	113	75.33
Female	37	24.5
Dominant hand		
Right	134	89.33
Left	9	6
Both	7	4.6
Place of work		
Specialist practice/day clinic	47	31.33
Govt. hospital	80	53
Private hospital	23	15.2
Work Breaks		
None	39	26
Occasionally	82	54.4
Regular	29	20
Physiotherapy		
None	30	20
3–4 times per month	78	51.7
7–8 times per month	30	19.9
Daily	12	8

The endoscopist were predominantly male (n = 113; 75.33%), with that of 37 number of females and a percentage 24.5%. The majority of the participating endoscopists were the specialists in endoscopic (n = 150; 88.1%) working in government hospital (n = 80; 53.0%) or a day clinic (n = 47; 38.33%). The contributions averaged 21.0 years of experience and 8.2 hours of active labour each day in endoscopic facilities. The dominant hand is right hand (n = 134; 89.33%) rather than left hand (n = 9; 6%) used in the procedures of endoscopy. Interestingly, despite the differences in complexity between, for example, a diagnostic and an interventional ERCP, our findings did not demonstrate that a particular endoscopic treatment was more strongly connected with the prevalence of musculoskeletal bone health issues. To comprehend this, it is essential to remember that the fundamental process of musculoskeletal impairments is an overuse injury from recurrent examinations, which would be evident both in the high volume of repeated, uncomplicated endoscopic operations and fewer, more complex procedures. But it must be acknowledged for future research that musculoskeletal health issues and, subsequently, ergonomic consequences, may vary across various kinds of evaluation.

Endoscopists must carry out endoscopy-specific movements, such as firmly twisting with the right wrist during a colonoscopy and changing the endoscope's tip angulation controls with the left thumb (Liberman et al., 2005; and Shergill et al., 2009). Additionally, during a regular colonoscopy, left wrist extensor, left thumb extensor, and the right wrist extensor activities surpassed the limit of action of hand activity level set by American Conference of Industrial Hygienists (Shergill et al., 2009). When performing the colonoscopy procedure, novices exert much higher clockwise torque with their right wrist than experienced practitioners (Ende et al., 2018). In contrary, recent European research found that consultants were substantially more likely than fellows to have wrist discomfort and hand numbness. In the prior research, the sample size for consultants (n = 133) was larger, but the sample size for fellows (n = 38) was less. This variation may be the cause of the observed disparity in the findings (Morais et al., 2020).

There was a correlation between the frequency of musculoskeletal injuries in other jobs and parameters linked to workload, such as the number of operations or length of labour (Cromie et al., 2000). Alternatively, the study found no significant association between the frequency of endoscopy-related musculoskeletal injuries and the length of time spent conducting a number of endoscopic procedures (Ridtitid et al., 2015). In contrast to ultrasonography, endoscopic examination as well as the process show variation in procedure duration, posture, and the endoscope specifications. Consequently, to use a multiple regression of endoscopy-related musculoskeletal injuries at each site, we confirmed the danger of endoscopy-related process time influencing musculoskeletal injuries (i. e., shoulders, neck, and low back).

Less than 50% of endoscopists respond to surveys on universal safety precautions (Angtuaco et al., 2003). During an endoscopy, the mucocutaneous exposure's risk to bodily fluids is higher. According to Mohandas and Gopalakrishnan (1999), mucocutaneous exposure occurred in at least 13% of treatments. Their analysis revealed a splash rate of 9.5% towards the forearms, face, and feet, as well as 4.1% to the eyes. Personnel with chronic venous insufficiency or those who must stand for lengthy periods of time may also benefit from compression stockings. None of these therapies, however, have undergone unbiased testing in an endoscopic suite. Certain therapies' viability also calls for further research and debate.

CONCLUSION

Overall, participating endoscopists have expressed a strong need for further observational and interventional research for prevention of the work-related musculoskeletal injuries and health problems, and these studies are required to enhance individual health and job performance.

The hazards involved with gastrointestinal operations and the interventions utilised must be known to endoscopic staff. To achieve this, the right safeguards should be taken in accordance with the process being carried out. Endoscopists' demands should be taken into account when designing ergonomic solutions to lessen strain and other associated ailments. Interventions to lower the risk variables connected to endoscopic musculoskeletal injuries have not been explored in any studies. However, there are lessons and guidelines from other workplace interventions that may be used.

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