Assurance for Endurance? Introducing a Novel Ergonomics Curriculum to Reduce Pain and Enhance Physical Well-Being Among GI Fellows

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Abstract

Musculoskeletal pain and injuries (MSKPI) are common among gastroenterologists (GI) and GI fellows. Common areas of pain include the back, neck, hands/fingers, shoulders, and elbows. Although the prevalence of career-related pain and injuries among GIs is high, few endoscopists receive training in how to prevent MSKPI. We developed an ergonomics curriculum for our GI fellows that consisted of two modules that were led by physical therapists. Twelve out of 15 GI fellows, and one out of two hepatology fellows, participated in Module 1. Prior to the first module, 77% of participants reported pain in one or more body parts. Of those who reported pain, 100% of the fellows stated that this pain occurred during procedures, and 50% indicated this pain was performance-limiting. After completing Module 1, 100% of fellows reported that this was a valuable topic and 100% of the participants felt that this information would both help them feel and perform better. All fellows stated they had an immediate decrease in physical discomfort after engaging in the exercises that were included in Module 1. Eight fellows participated in Module 2. At the end of this module, 100% of fellows reported that this ergonomics training would likely help them to “physically perform better during procedures” and 100% of fellows indicated a reduction of physical discomfort (pain, aching) immediately after completing these exercises. Preliminary data indicated that this novel curriculum was perceived as valuable by GI fellows and that practicing these exercises reduced pain, particularly in the neck and the lower back.

Introduction

Numerous studies have found that musculoskeletal and pain symptoms are common among gastroenterologists (GI) and GI fellows [1–4]. In fact, a 2018 National Survey of 165 GI trainees found that musculoskeletal pain and injuries (MSKPI), especially involving thumb and other hand pain, may affect up to 20% of GI fellows [1]. Other research has found that 89% of endoscopists suffer from MSKPI in at least one anatomic location and that many of these respondents (67%) complained of pain at rest [2]. A systematic review of 13 studies on MSKPI among GI endoscopists

identified that 39–89% of surveyed endoscopists reported pain and/or injuries related to endoscopy [3]. This review also found that the most common areas of reported pain were the back, neck, hands/fingers, shoulders, and elbows [3].

Several studies identified factors that increase the risk of developing MSKPI among GIs [3, 4], including procedure volume [3, 4], time spent performing endoscopy [3, 4], cumulative time in practice [3, 4], endoscopist age [3], and gender [1, 5]. Other factors related to the development of severe pain include (1) standing position during upper endoscopy, (2) posture during endoscopic procedures, and (3) having multiple symptomatic areas [2].

Given the prevalence of career-related pain and injuries among GIs, researchers have called for the development of education and curricula to address this problem; however, the literature on ergonomics training aimed at increasing awareness and prevention of career-related pain and disability among GIs/GI fellows is scarce. A recently published study implemented a simulation-based ergonomics training curriculum [6]. This curriculum consisted of a didactic lecture and video, feedback from supervisors, and a checklist to augment feedback and promote self-reflection in order to

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address MSKPI risk during colonoscopy [6]. Although these researchers demonstrated that this ergonomics training curriculum was associated with reduced risk of MSKPI during endoscopy, they found that even after this training, the intervention group was still within the medium risk range [6].

Surgeons and surgical trainees also experience high rates of work-related MSK pain that can lead to practice restrictions and early retirement [7]. Based on these findings, we developed an ergonomics training curriculum for our general surgery residency program aimed at addressing this important issue [8] and also created a similar program for GI fellows at our institution. While another group developed an ergonomics training program for novice endoscopists [6], ours may be the only curriculum to enlist physical therapy (PT) experts to engage fellows in learning ergonomics exercises through active practice, rather than a routine didactic session, and to introduce fellows to a “microbreaks” model with targeted stretching that has been used with surgeons to help reduce pain, and enhance performance and mental focus without extending operative time [9].

Methods

The study protocol was reviewed and approved by the University of Miami Institutional Review Board (IRB protocol number: #20190439). No funding was received for this pilot project. Two modules were presented by PT experts over the course of the 2018–2019 academic year to GI fellows. The following is a description of each 60-min module:

Module 1 An overview of the findings from the MSK pain and injury literature was presented to GI fellows. The microbreaks model [9] was also presented during this module, as well as a few slides that emphasized the importance of posture and the definition and the concept of “ergonomics.” Fellows then practiced stretching exercises for their cervical and lumbar spine, as well as for their shoulders, arms, and hands, as these were the areas which were identified as especially problematic for endoscopists [3]. Specifically, our PT experts taught fellows the following exercises: (A) chin tuck (cervical spine); (B) scapular retraction (rotator cuff/shoulders); (C) medial nerve glide (wrist/carpal tunnel); (D) tendon gliding exercises (hand); (E) posterior pelvic tilt (lumbar spine). These exercises, as well as many others, can be found in an excellent book authored by Moffat and Vicery [10].

Module 2 The second module was focused on allowing fellows to continue to practice the postural and stretching exercises from the previous module, as well as the microbreaks model [9].

Fellows completed a short pre-survey that assessed location and severity of pain prior to exposure to Module 1. A post-survey of location and severity of pain was given after Module

2. Brief post-conference evaluations, based on a 5-point Likert scale (0=strongly disagree; 5=strongly agree), were administered after each module. These evaluations contained questions about the value of topic, how pain affected performance during procedures, perceived pain after engaging in the exercises, and perceived efficacy of these exercises during procedures. These measures had been originally modified and/or developed for use with surgical residents [8].

Results

Fellows were offered participation in a total of two ergonomics training modules.

Module 1 Twelve gastroenterology (GI) fellows out of a total of 15 GI fellows in our program and one hepatology fellow out of a total of 2 hepatology fellows in our program completed the pre-survey prior to Module 1. A majority of the participants stated that they were aware of ergonomics principles (62%), which was defined as the concept of improving the design of work environments and enhancing physical movement in order to avoid injury during procedures. Almost all of the participants were interested in learning more about ergonomic principles (93%). Prior to Module 1, 77% of participants reported pain in one or more body part. Of those who reported pain, 100% of the fellows stated that this pain occurred during procedures, and 50% indicated this pain was performance-limiting. Despite this, only 20% (2/10) had sought medical attention for this pain. The two most common sites listed for pain were the neck and lower back. Of those who reported pain, severity ranged from 2 to 8 out of 10.

After completing Module 1, 100% of participants felt this was a valuable topic (mean 4.6/5). Furthermore, 100% of the participants felt that this information would both help them feel better (mean 4.7/5) and would help them perform better during procedures (mean 4.7/5). All participants reported they had an immediate decrease in physical discomfort (mean 4.8/5) after engaging in the exercises in Module 1.

Module 2 Eight GI fellows completed the post-conference evaluations at the end of Module 2. 100% of fellows indicated they felt this ergonomics training would likely help them to “physically perform better during procedures” and 100% of fellows reported a reduction of physical discomfort (pain, aching) immediately after doing the exercises during Module 2.

Discussion

Preliminary data from this retrospective study indicate that this novel curriculum was perceived as valuable by GI fellows and that practicing these exercises, as well as use of the microbreaks model, reduced pain, particularly in the neck

and lower back. The main limitation of this study was the small sample size. Moreover, we did not identify which type of procedure (i.e., upper endoscopy, colonoscopy, ERCP) contributed to the most discomfort among our fellows. Despite these limitations, the findings appear to suggest that GI fellows find an ergonomics curriculum with training in peri-procedural microbreaks to be a valuable undertaking and appear to derive immediate benefits in terms of decreased pain following participation in these exercises. Further research is needed in order to determine the actual effects of these exercises during procedures. Furthermore, in order to validate that our training does indeed provide “assurance for endurance,” we will seek to clarify the long-term effects of this ergonomics curriculum on decreasing MSKPI and promoting physical well-being in a larger sample of GI fellows, preferably performed prospectively with a control group.

Compliance with Ethical Standards

Conflict of interest All authors declare that they have no conflict of interests.

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