Impact of Simulation-Based Training on International Pain Fellows: A U.S. Partnership Model

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Introduction

Global health partnerships increasingly incorporate structured procedural training for international trainees, but objective measurement of skill acquisition is uncommon in this setting.[4,5] Most bilateral exchange programs report participation numbers rather than measurable competency outcomes.[5] We evaluated knowledge and procedural skill acquisition among Ghanaian pain medicine fellows following a two-week training block combining cadaver-based instruction and simulation laboratory sessions using spine phantoms and task-training devices at a U.S. academic pain center.[1,2]

Material and Methods

Three Ghanaian pain medicine fellows, with limited independent procedural experience (performed 0-3 times across procedures) and variable prior exposure (observed or assisted), completed a two-week training block at a U.S. academic pain center: daily phantom/device-based simulation practice and a day's session at a cadaver laboratory. A written knowledge test covering seven core interventional procedures (medial branch block, ganglion impar block, lumbar and caudal epidural steroid injection, intraarticular facet injection, sacroiliac joint injection, and transforaminal epidural steroid injection) was administered pre- and post-training. Procedural competency was independently scored by paired U.S. and Ghanaian faculty using a standardized 9-item checklist (0=not performed, 1=partial, 2=complete) with a maximum of 18 points per procedure and a Global Rating Scale with maximum of 35 points.[3]

Figure 1

Pain Medicine Fellows performing interventional pain procedures during cadaver skills lab.



Figure 2

Pain Medicine Fellow practicing fluoroscopic procedures on simulation phantom.



Results

Mean knowledge test scores improved from 66.7% pre-training to 86.7% post-training (+20 percentage points). Mean procedural competency scores, improved from 70.9% (week 1, n=22 evaluations) to 80.5% (week 2, n=41 evaluations), a gain of 9.6 percentage points. Improvements were observed for the majority of procedures including caudal epidural steroid injection (+20pp), sacroiliac joint injection (+20 to +30pp), and transforaminal epidural steroid injection (+55pp for one fellow). Two procedure-fellow pairings scored lower at week 2 than week 1, reflecting single-attempt performance variability in a small cohort rather than a consistent decline. The mean post-training Global Rating Scale assessment score of 3.4/5 across procedural domains, with highest ratings for tissue and specimen handling (mean 4.5-5/5) and lowest for procedural flow and fluoroscopic guidance (mean 2-3/5), with between-fellow variability (range 2.9-3.6/5).

Discussion

A structured two-week training block combining cadaver- and simulation-based instruction was associated with measurable gains in procedural knowledge, hands-on competency, and global performance ratings among international pain fellows, despite a small pilot cohort.[1,2] Isolated single-procedure declines likely reflect performance variability rather than a training deficiency. We present an objective assessment of knowledge and procedural competency that complements participation-based reporting in global health training partnerships[4,5] and provides a reproducible framework for competency-based bilateral curricular exchange.

References

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