

1 Does a specialised orthopaedic trauma module utilising high  
2 fidelity simulation improve student nurses' perceptions of  
3 their competence? A Pilot Study  
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5

6 **ABSTRACT**  
7

8 Background: Trauma is the fourth leading cause of death in the western world, and  
9 traumatic injuries are recognised to be clinically challenging to care for. Orthopaedic  
10 trauma care is not standard content on pre-qualifying nursing curriculums, compounded by  
11 a dearth in specialised post-qualifying education internationally. As a result, registered  
12 nurses may not have the clinical skill set to appropriately manage traumatic conditions.

13 Aims: To understand pre-qualifying student nurses' perceptions of their own competence in  
14 orthopaedic trauma care and understand if utilisation high fidelity simulation improves  
15 confidence, knowledge and application of theory.

16 Methodology: A small-scale qualitative pilot study utilising purposive sampling, designed to  
17 inform the development of a larger longitudinal study A 5-point likert scale with options for  
18 qualitative comments was administered after and 8 weeks of a specialised module  
19 culminating in a high-fidelity simulation and in-depth debrief session. Thematic analysis was  
20 conducted.

21 Findings: All students found that the module improved their confidence and knowledge in  
22 their skills set. The high-fidelity simulation was found to be an effective learning  
23 environment to translate theory to practice.

24 Conclusions: Specialised orthopaedic trauma training is found to be effective in improving  
25 student nurses' knowledge and perceived competence in trauma care. High fidelity  
26 simulation is found to be a valuable teaching tool to develop student's skill sets in complex  
27 scenarios and support application of theory to practice.

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29 Keyword: Student Nurses, High-Fidelity Simulation, Orthopaedics, Trauma, Education.

## 30 **INTRODUCTION**

31

32 The nursing care of orthopaedic trauma patients is recognised to be a highly specialised  
33 area of practice, however there is a international paucity of specifically designed training  
34 programmes for both undergraduate and post-graduate nurses (Benham and Geier 2014,  
35 Clarke and Santy-Tomlinson 2014, Griffiths and Houghton 2013, Haywood et al. 2012, Judd  
36 2010, 2019, Klunder-Rosser 2019). This small-scale pilot project looks at the impact of an 8-  
37 week orthopaedic trauma module with embedded High-Fidelity Simulation upon the  
38 perceived orthopaedic trauma competence of second year student nurses at one United  
39 Kingdom University. Throughout this paper the term trauma refers only to orthopaedic  
40 trauma, unless specifically stated otherwise.

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42

## 43 **BACKGROUND**

44

45 Trauma is the fourth leading cause of death in the western world. Traumatic injuries can be  
46 associated with significant morbidity and mortality and require highly specialised care for  
47 injuries to improve patient outcomes (Credland 2016, Kellezi et al. 2017, National  
48 Confidential Enquiry into Patients Outcomes and Death [NCEPOD] 2007). The implications of  
49 poor or inappropriate nursing care for trauma patients can be severe, culminating in a high  
50 risk of secondary injury, limb loss or death (Alzghoul 2014, NCEPOD 2007). Trauma care is  
51 particularly clinically demanding due to the unpredictable nature of injuries, number of  
52 physiological structures potentially involved and consequent complexity of care required  
53 (Clarke and Santy-Tomlinson 2014). It is therefore vital for all nurses caring for trauma  
54 patients in any clinical setting to be appropriately trained to recognise and manage the  
55 implications of traumatic physiology to prevent deterioration and complications of injury  
56 such as osteomyelitis and compartment syndrome (Benham and Geier 2014, Credland  
57 2016).

58 The Nursing and Midwifery Council [NMC] (2018a, 2018b) in the United Kingdom  
59 [UK] holds all nurses accountable to ensure they develop and maintain the skills and  
60 knowledge required to practice effectively, expecting Higher Education Institutes (HEI's) to  
61 ensure student nurses meet the basic standards to register as a qualified nurse. The Royal  
62 College of Nursing [RCN] (2019) argue trauma and orthopaedic [T&O] nurses require  
63 specialist skills and knowledge to competently act as T&O practitioners. Despite this a  
64 perceived lack of orthopaedic competence and post-graduate training opportunities has  
65 been consistently identified in contemporary nursing research (Altmiller 2013, Alzghoul  
66 2014, Clarke and Santy-Tomlinson 2014, Haywood et al. 2012, Klunder-Rosser 2019, Judd  
67 2019). The global nature of this challenge can be highlighted by consistent themes in the  
68 international literature. Benham and Geier (2014) emphasise the lack of specific

69 musculoskeletal training and education for primary care nurses in the United States of  
70 America, whilst Fourie, Floyd and Marshall (2015) address the lack of knowledge around  
71 osteoporosis in New Zealand and El-Dakhakhny (2010) tackles the lack of understanding of  
72 skeletal traction in Egypt. This gap in knowledge is compounded in undergraduate nursing  
73 curricula internationally, where specific orthopaedic assessment skills are not taught as they  
74 are deemed to be specialised, and so specialised training is not delivered at any level  
75 (Benham and Geier 2014, Judd 2019). This is further highlighted by both the British and  
76 American Militaries, where significant preceptorship is required to equip newly qualifying  
77 nurses operating in the military forces with specific trauma skills not developed in pre-  
78 qualifying training (Berwick, Downey and Cornett 2016, Finnegan et al. 2015).

79           One barrier in undergraduate nurse training to developing orthopaedic competence  
80 is the inability of HEI's to guarantee student nurses an orthopaedic trauma clinical  
81 placement during training. Innovative teaching methods are being increasingly adopted by  
82 HEIs to provide students with the experience of practicing clinical skills adopted in a  
83 simulated environment, and this has been endorsed by the NMC (2018 a, b) to allow  
84 increasing student nurses numbers by alternatively managing the limited clinical placement  
85 capacity (Basak et al. 2016). High Fidelity Simulation [HFS] is a possible solution to bridge  
86 the gap between exposure and skill development to promote applied clinical reasoning, as  
87 already utilised successfully for other skills such as cardiac resuscitation. HFS has been  
88 shown throughout the literature to facilitate knowledge and skill acquisition as it allows  
89 students to apply theoretical knowledge to a realistic clinical scenario, within a safe and  
90 controlled setting (Mills et al. 2014, Richardson and Claman 2014). Students can make  
91 clinical decisions about patient care without causing harm and explore the impact and

92 rationale of these decisions in detailed de-brief sessions, providing a valuable reflective  
93 learning experience (Gates, Parr and Hughen 2012).

94

## 95 **AIM AND SCOPE**

96 Limited research exists looking at the use of HFS specifically to develop specialised trauma  
97 and orthopaedic skills in undergraduate nurses. This pilot study aimed to identify if a  
98 specialised 8-week trauma module for second year nursing students at one University in  
99 North West England can improve students' perceptions of their competence in orthopaedic  
100 trauma and support their application of theoretical content to clinical practice. The project  
101 has been designed as a pilot study to inform the development of a larger longitudinal study.  
102 The objectives of this study are to:

- 103 • To understand students' perceptions of their own knowledge and skill set regarding  
104 specialist T&O patients.
- 105 • To evaluate the efficacy of HFS in helping student nurses understand and translate  
106 complex, specialist T&O knowledge into clinical practice.

107

108

## 109 **METHODOLOGY**

110 This was a small-scale qualitative pilot study. As part of the standard second year pre-  
111 registration curriculum, students were given some choice in their theoretical content. They  
112 were able to choose 2 optional modules from 8 possibilities in the second semester of year  
113 2, one of which was the Care of the Orthopaedic Trauma Patient module. This module was  
114 delivered over 8 weeks, utilising specialised lectures and seminars delivered by subject  
115 experts. Theoretical content was aligned to the RCN (2019) competency framework for

116 orthopaedic and trauma practitioners. This framework provided the basis for the students'  
117 summative assessment for the module, where students presented a reflective self-  
118 assessment of their development during the module benchmarking their competence  
119 against the RCN (2019) framework. An indication of the taught content of the module can  
120 be seen in Table 1. The module culminated in a high-fidelity simulation scenario, applying  
121 the theoretical principles to a specially designed clinical scenario, followed by a detailed de-  
122 brief session. The design for the clinical scenario was based upon an optional HFS delivered  
123 to students at the same University in 2017 (Pennington and Klunder-Rosser 2017), and  
124 feedback from this simulation was used to develop the module content and HFS.

125

126 **INSERT TABLE 1 HERE**

127           The clinical scenario was based upon a young male patient with known substance-  
128 abuse issues developing compartment syndrome after a tibial fracture. Compartment  
129 syndrome was used as a clinical diagnosis as it is a limb- and life-threatening condition  
130 which is often poorly recognised or misdiagnosed (Sigamoney et al. 2015). Students were  
131 supported through 4 stages of the scenario to utilise skills such as pain assessment,  
132 neurovascular assessment, fracture management and communication skills [see table 2]. 2  
133 Student took part in each section of the scenario , guided throughout by a lecturer acting as  
134 the clinical mentor. Each pair took part in one section of the scenario, with 8 students in  
135 total participating in the clinical simulation. The remaining students watched their  
136 colleagues on a live feed in a separate room, with a lecturer present to encourage discussion  
137 and peer assessment of their colleague's clinical decision making, guided by the RCN (2019)  
138 competency framework which the students had utilised throughout the module. The

139 simulation took 40 minutes, followed by an 80-minute de-brief session with all students  
140 present, led by two lecturers. Students were given the questionnaire to fill out  
141 anonymously by the teaching staff immediately after the debrief. The staff then left the  
142 room to reduce response bias, and a box file was provided for students to submit their  
143 forms too.

144 **INSERT TABLE 2 HERE**

145

## 146 **SAMPLING**

147 Purposive sampling was utilised to ensure only students undertaking the required module  
148 were involved in research. All second-year student nurses from all three fields of practice  
149 (adult, children and young people and mental health) who enrolled on the “Care of the  
150 Orthopaedic Trauma Patient” module were invited participate in the research verbally and  
151 by email on the first day of teaching. Due to restrictions on the number of students able to  
152 undertake a HFS scenario meaningfully and the specialist knowledge require to run the  
153 module and HFS, the sample was anticipated to be small for this pilot study.

154 Each of the optional modules available to students on this curriculum was ‘capped’  
155 at 30 participants, and 30 students enrolled on the module. 24 students were recruited to  
156 the study, but 5 students were subsequently absent from the HFS and so their data has not  
157 been included in the data set. Data from 19 participants was included in the final data  
158 analysis.

159

## 160 **DATA COLLECTION**

161 Data was collected by a questionnaire with both closed and open-ended questions post- HFS  
162 scenario (Andrew and Halcomb 2009). The questionnaire used was based upon the form  
163 utilised by the Universities simulation team to assess HFS during teaching and so was  
164 deemed to be a reliable and replicable tool and students are already familiar with a version  
165 of it (Green and Thorogood 2014) (see figure 1). The questionnaire utilises a 5-point Likert  
166 Scale, with and options for additional qualitative comments and feedback. The RCN (2019)  
167 Framework for Orthopaedic Practitioners was using during the debriefing to allow students  
168 to self-asses their knowledge and competence as this had been used as a framework for the  
169 modules theoretical content and summative assessment. Students were encouraged to  
170 consider this in their qualitative comments. Data was collected between April – July 2019.  
171 Thematic analysis was used to analyse qualitative data due to its flexible nature and  
172 potential to garner insightful key-findings from the data set (Nowell et al. 2017). To improve  
173 credibility in the study’s findings, data was initially coded by both researchers independently  
174 to ensure rigour, before both researchers met to agree final themes (Green and Thorogood  
175 2014).

176 **INSERT FIGURE 1 HERE**

## 177 **ETHICS**

178 Ethical approval for this study was sought and granted from the XXXXXXXX Health Research  
179 Ethics panel (application **HSR1718-066**). Informed written and verbal consent was gained  
180 from all participating students at each stage of the research.

181

## 182 **RESULTS**



183 Three themes were identified from the data collected:

184

185 **Translation of theory to practice**

186 All students participating in this study agreed that feedback from the simulation was  
187 valuable in helping them develop their knowledge and skills, with 58% of students strongly  
188 agreeing (11) (see table 3). The design of the simulation which followed the whole patient  
189 episode, including complex social issues which are often present in real- life but sometimes  
190 absent from traditional clinical skill sessions, was identified as being particularly useful.  
191 Students felt that this allowed them to consider holistic patient assessment and apply the  
192 theoretical content in a more effective and realistic way, stating it *“was interesting to see*  
193 *the whole picture of assessment”* rather than specific conditions in isolation.

194 The clinical scenario the students faced was complex, focussing on compartment  
195 syndrome in a young patient with significant social issues. None of the students had seen  
196 this condition in clinical placements, and had not heard of it prior to this module. Rather  
197 than breaking down individual assessments (such as a neurovascular assessment)  
198 individually, the students needed to consider a wide range of factors and synthesise this  
199 information to inform their overall assessment and clinical decision-making. Students fed  
200 back that it *“was interesting to see what I would do or remember in real patient situations”*.  
201 The complex presentation of the patient was recognised as being challenging to manage.  
202 However, the students found the scenario to be an effective learning tool that allowed them  
203 to explore and apply the theoretical module content to ‘real’ patients. This was especially  
204 true for students undertaking mental health training, who do not have the same physical  
205 health exposures as adult and children’s nurses but must still deliver some physical care.

206

207 **INSERT TABLE 2 HERE**

208

209 **HFS as an effective learning environment**

210

211 100% (19) of students agreed that the use of high-fidelity simulation to assess their  
212 knowledge and skills in trauma care worked well, with 42% strongly agreeing (8) finding the  
213 environment to be an *“excellent learning environment. Very good tutors”*. 7 students  
214 identified the learning environment as having an impact upon their learning and  
215 development. Students found the HFS useful to feel like they were taking part in ‘real’  
216 clinical practice as *“the patient speaking helped towards our assessment of the injury. A to E*  
217 *(a structured emergency assessment algorithm) was encouraged to be used”*.

218 Whilst most of the feedback in this study was positive some students found that the  
219 unnatural environment was distracting. In discussion with the group during de-briefing  
220 from the HFS, an element of unnatural noise prevented some students from fully engaging  
221 with the scenario. This is a challenge in HFS as it is difficult to limit this impact outside of a  
222 real clinical environment, however on this occasion no students felt that this detracted from  
223 their learning experience in any major way.

224

225 **Confidence**

226 All students (19) found that the HFS allowed them to develop their own confidence and feel  
227 empowered to make clinical decisions. It also became clear that students found the de-brief

228 session to be the most informative element of the HFS as it allowed them to explore and  
229 critique their clinical decision making and rationale without fear of criticism. This  
230 encourages reflection and open discussion, and students felt that this gave them  
231 *“confidence that no questions is a stupid question”*

232 A key part of developing the students’ confidence to fully engage with the scenario  
233 appears to be ensuring students are fully prepared to participate in a simulation and  
234 supported throughout by experienced staff. Mimicking the mentor-mentee relationship of  
235 clinical practice can ensure students feel empowered to engage, and so students felt *“we*  
236 *were guided well and given directions to follow scenario”*. This ensured that students felt  
237 they could participate in the scenario without feeling embarrassed or uncomfortable.

238

239

## 240 **DISCUSSION**

241 Trauma is the leading cause of death in people under the age of 40 and is the major cause of  
242 mortality and injury in developed countries. Nearly 50% of the worlds’ injury-related deaths  
243 are in young people between the ages of 1 – 44, and it is now the main cause of death for  
244 the ages 5-29 (Biz et al. 2016, Parker and Magnusson 2016, UN 2019). 30% of patients who  
245 die from traumatic injuries do so in the days or weeks after injury. Death arises from  
246 complications of the injury but skilled nursing care, assessment and intervention can  
247 prevent many complications associated with fractures, such as delirium and renal injury  
248 (Klunder-Rosser 2019, Maher et al. 2012, Parker and Magnusson 2016). Along with their  
249 international counterparts, the NMC (2018a, b) expects HEIs to appropriately prepare  
250 student nurses for clinical practice, but it is challenging for HEIs to provide students with

251 clinical placements that will allow them to develop and apply trauma skills in a real-life  
252 situation. This is aggravated by the challenging landscape facing healthcare internationally.  
253 Recruitment and retention of nurses has reached critical levels globally, with the WHO  
254 (2020) highlighting the urgent need to train and retain nurses in all parts of the world.  
255 However insufficient clinical placement areas are available to HEIs making it difficult for  
256 them to significantly increase the training places required to plug the staffing gap (RCN  
257 2018).

258           The utilisation of theory followed by clinical simulation within a safe and structured  
259 setting is supported throughout the literature as an effective way to develop trauma skills.  
260 Credland (2016) highlighted the importance of ensuring that orthopaedic practitioners  
261 understand the complex physiology underpinning the pattern of physical consequences of  
262 musculoskeletal trauma. In this study, students were provided with 8 weeks of detailed and  
263 specialised content prior to their HFS, and the results support that this theoretical  
264 underpinning allowed them to better understand and apply aspects of trauma physiology to  
265 clinical nursing assessments. However, this module only enables students to have a more  
266 detailed understanding of trauma care generally and does not prepare them to be  
267 specialised trauma practitioners. There are some contemporary examples of targeted  
268 orthopaedic training utilising individual lectures which have been used for registered nurses  
269 working within an orthopaedic setting with a specific objective in mind which support the  
270 pedagogy used in this study. Khajuria et al. (2017) and Turney et al. (2013) utilised  
271 individual lectures to develop qualified nurses' knowledge and understanding of Acute  
272 Compartment Syndrome (ACS). Both studies reported the success of these sessions, but  
273 Khajuria et al. (2017) strongly emphasised the need for continued education to support the  
274 development of orthopaedic nurses. However these studies look at trauma training for

275 post-qualifying nurses rather than students, and this makes it challenging to draw direct  
276 comparisons or conclusions about this studies ability to prepare students to practice as  
277 registered nurses, rather than specialised nurses.

278 It is unrealistic to expect undergraduate nursing curriculums to deliver dedication  
279 modules for every specialism. Indeed, this cannot be expected if HEIs are to produce  
280 registered nurses with the general skills set to meet the NMC's (2018 a, b) standards for  
281 registration. Furthermore, the inability of HEIs to expose all students to specialist practice  
282 is further exacerbated by the challenges faced by HEIs securing enough clinical placement  
283 areas for student nurses. As a result, many student nurses graduate without any meaningful  
284 or consistent exposure to orthopaedic trauma despite its prevalence in healthcare (RCN  
285 2018, Benham and Geier 2014). Due to the prevalence of orthopaedic trauma globally, it is  
286 likely that many nurses will come across a traumatic injury within their career but not have  
287 the skills to appropriately assess and monitor the injury to avoid complications (Kellezi et al.  
288 2017). An example of this is the significant delay in diagnosis of complications of injury  
289 requiring urgent surgical treatment, such as compartment syndrome, and orthopaedic  
290 assessment skills in primary care. This is due to a lack of awareness and skill to assess the  
291 condition amongst nursing staff (Benham and Geier 2014, Khajuria et al. 2017, Sigamoney et  
292 al. 2015). However, this study has demonstrated that using innovative pedagogy can help  
293 develop theoretical application to clinical scenarios and could be replicated in a more  
294 targeted way for specific T&O skills to prepare them for general practice. It is not possible  
295 to guarantee students nurses will see clinical conditions such as compartment syndrome in  
296 practice even if assigned to an orthopaedic unit, however HFS can simulate the condition  
297 effectively. This is especially apt when ongoing education to ensure nurses have  
298 appropriate specialist skilled is a significant challenge internationally, as funding for post-

299 qualifying nursing training is scarce (Beech et al. 2019, Brown and Merrill 2015, Clarke and  
300 Santy-Tomlinson 2014, Haywood et al. 2012, Judd 2019, Greatback 2016, Klunder-Rosser  
301 2019).

302           The need to utilise a broader pedagogy to support clinical students' skill  
303 development is increasingly being recognised and fully utilising alternative creative  
304 pedagogies may go some way to addressing this gap. The NMC (2018) standards for pre-  
305 registration nursing advocate for simulation-based learning to be utilised appropriately to  
306 support students learning and assessment during their training. HFS has repeatedly been  
307 found to be an effective teaching tool, capable of supporting inspiring learning  
308 environments that stimulated enthusiasm and engagement in student (Baptista et al. 2016).  
309 However, Yuan et al. (2011) have stressed the need to collect more quantitative data to  
310 support a statistically significant link between HFS and student confidence and skill  
311 acquisition. Findings in this study regarding students' perceptions of their own learning may  
312 be due to an impression that HFS is more effective at developing confidence and skill levels  
313 than alternative low fidelity simulations (Basak et al. 2016).

314           Nevertheless T&O care needs to be supported by post-qualifying education which  
315 goes beyond nurses working in explicit orthopaedic environments. An example of this is  
316 trauma patients who are cared for in critical care units where nursing staff may not have  
317 specialised experience outside of critical care medicine (Sigamoney et al. 2015). Sheikhi,  
318 Heidari and Shahbazi (2013) recognise this in their study of critical care nurses' management  
319 of complications from pelvic fracture. Although Garner et al. (2014) advocate for an  
320 algorithm to help inexperienced staff properly escalate suspected compartment syndrome,  
321 this type of flow chart is only useful if nursing staff are confident in initially identifying the

322 potential risk. The findings of this study support research by Turney et al. (2013) in that  
323 specific education of complications of traumatic injury can overcome the barriers of lack of  
324 confidence and competence and improve specialised trauma skills such as neurovascular  
325 assessment.

326           Nursing has been recognised as an under-utilised resource in trauma care and  
327 training and empowering nurses to improve their skills set would help reduce mortality and  
328 morbidity from traumatic injuries (Klunder-Rosser 2019, WHO 2020). Although it is difficult  
329 to make generalisations from a small sample size, this study's findings suggest that  
330 embedding orthopaedic and trauma content and HFS within undergraduate curricula may  
331 go some way to equip students with basic trauma skills such as neurovascular assessment. .  
332 This is perhaps unsurprising, as contemporary research has consistently demonstrated that  
333 HFS is an effective tool for improving healthcare students' confidence and competence  
334 (Baptista et al. 2016, Yuan, Williams and Fang 2011). It is highly unlikely that one module  
335 would be enough to develop skilled trauma practitioners, but this may begin to equip  
336 nursing students with basic elements of specialised orthopaedic assessment to be able to  
337 competently care of trauma patients in non-specialist settings. A real link between  
338 perceived confidence and actual skill development may not be realised until the student  
339 encounters the clinical experience in real-life. These findings are further limited by the  
340 paucity of research looking specifically and trauma nursing knowledge and skills in student  
341 nurses.

342

343 **CONCLUSIONS**

344 Nursing students from three fields of practice identified that module content and  
345 accompanying HFS improved perceptions of their knowledge and competence in  
346 orthopaedic trauma care. This is unsurprising, as many students had very limited  
347 orthopaedic teaching prior to the module delivery. The results add to the small pool of  
348 research supporting greater visibility of orthopaedic trauma in undergraduate nursing  
349 curriculums. This study also supports findings from wider existing research that HFS is an  
350 effective teaching methodology to help nursing students apply theory to practice. Unless  
351 specific orthopaedic content is more widely included as standard on pre-qualifying nursing  
352 curricula, there will continue to be a knowledge and skills gap amongst registered nurses in  
353 the developing and maintaining basic orthopaedic trauma competence. This study offers  
354 some potential solutions for how this gap could be addressed, but more large-scale research  
355 is required to ascertain if students' confidence and perception of their own competence can  
356 be translated into real-life clinical practice.

357

## 358 **LIMITATIONS**

359 This was a small-scale pilot study with a small sample size and a limited data set. The  
360 participants enrolled in this study opted to undertake an optional Trauma module, which  
361 makes it likely they had an interest in the topic prior to the research project. This may mean  
362 the results are less generalisable to the entire undergraduate nursing cohort than if a wider  
363 sample had been taken. The research was also conducted by the same staff who led the  
364 Trauma module, and so this may have led to some response bias from the student cohort,  
365 or conformation bias from the researchers despite steps taken to avoid this. This study was  
366 also conducted in one of the largest Nursing departments in the UK with extensive clinical



367 simulation facilities, and several lecturers available with a background in trauma and  
368 orthopaedic nursing at a senior level who are also experienced in high fidelity simulation. As  
369 a result, the module may not be replicable in departments who do not have access to these  
370 skill sets or facilities. Further research with larger sample sizes is needed to judge if the  
371 results can be generalised to the wider nursing profession.

372

373

#### 374 **FUTURE RESEARCH**

375 Further research is needed to explore if specialised module content and application of HFS  
376 can meaningfully address the lack of orthopaedic and trauma content in undergraduate  
377 nursing curriculums and improve overall patient outcomes. A longitudinal study with a  
378 larger sample size and more detailed data collection is required, followed by real-life clinical  
379 placements in orthopaedic trauma environments to assess perceived competence. A larger  
380 longitudinal study has been planned to explore if the confidence perceived by the student  
381 nurses in this study translates to improved clinical application of knowledge in clinical  
382 practice.

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