

Developing an experiential learning activity for blood pressure measurements: results from a qualitative analysis of final-year medical students' experiences

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Abstract

Introduction: Experiential learning activities (ELAs) constitute a novel teaching method. This study aims to investigate the impressions and experiences of final-year medical students regarding an ELA during their clinical placement in the general practice (GP) course at the Medical School of the Aristotle University of Thessaloniki. The impact of this ELA on the students is examined based on their experiences. Sixth-year medical students participated in blood pressure (BP) measurements in primary healthcare units.

Methods: Students reported their experiences in a web-based Qualitative Survey. The reports were analyzed utilizing Braun and Clarke's qualitative analysis method. Forty-four medical students participated in the ELA.

Results: The analysis resulted in five themes: benefits for students, patients, and the health care system, facilitators, and obstacles for the action. Students gained theoretical and experiential knowledge and refined their communicational skills. Detection of patients with high BP and increase of their awareness towards hypertension are some of the benefits for the patients.

Conclusions: Considering the increased numbers of undiagnosed and uncontrolled hypertensive patients worldwide, along with the workload of physicians in everyday clinical practice, the subsequent challenge would be to investigate if the involvement of medical students such as ELAs could potentially contribute to the diagnosis and better control of hypertensive individuals in the community. HIPPOKRATIA 2024, 28 (1):72-78.

Keywords: Arterial hypertension, primary healthcare, undergraduate medical education

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Introduction

Modern medical education aims to create physicians with multiple clinical and communicational skills and a strong theoretical knowledge background¹. The daily challenging clinical environment healthcare workers face is making medical organizations and schools re-evaluate and re-establish the teaching procedure². Historically, laboratory training, lecture-based learning, and bedside teaching are implicated in training medical students for basic sciences and clinical courses^{3,4}. The adoption of contemporary teaching methods can contribute to the transformation of conventional medical education⁵. Global economic crisis, infectious pandemics, and global conflicts are some burdens the new era physician is required to confront^{6,7}. Plenty of different means have been used and proposed, aiming to develop doctors capable of facing the different challenges of practicing

medicine in the 21st century⁸. Experiential learning has been suggested as a novel teaching method. It is defined as the connection of the theoretical knowledge taught in the lecture with hands-on practice in real-life circumstances^{9,10}. Moreover, the experiential learning procedure contributes to the development of communicational and social skills of medical students, diminishing the important deficit in these skills^{10,11}. The importance of experiential learning in new-age medical curricula is evident¹⁰. Studies have shown that even the most commonly used clinical skills are not performed successfully in everyday clinical practice, not only by senior medical students but by healthcare professionals as well¹². Thus, actions both to improve the performance of basic clinical skills and patient-doctor communication are essential. In Greece, undergraduate medical education is divided into pre-clinical studies (two or three years) and clinical studies (four

or three years, respectively). In specific medical schools' introductory clinical skills classes have been introduced as part of the pre-clinical years courses, allowing the students to get acquainted with the clinical practice¹³. However, this is not implemented in all medical schools across the country, unlike in schools in the United States of America and the United Kingdom (UK), where clinical skills courses have been integrated into most medical curricula¹⁴⁻¹⁶. In Greece not all medical schools have integrated education in Primary healthcare (PHC), in contrast with UK where PHC courses are widely introduced in medical schools^{16,17}. Reforms such as emphasizing education in PHC and clinical skills can optimize medical education in Greece¹⁶.

PHC provides health education and promotion, as well as primary, secondary and tertiary prevention in patients of all age groups¹⁸. Recently, the focus has been shifted to the evolution of PHC in order to be able to fulfill the goals of global adoption and sustainability, improving health-related outcomes, and effectively addressing evolving population needs¹⁹. The importance of medical students getting acquainted with various PHC models, even from the pre-clinical years, has been highlighted²⁰. While PHC and general practice (GP) courses have been integrated into medical schools' curricula, GP remains out of most students' career choices in Greece and other countries^{21,22}. Numerous published studies have proposed that exposure in primary healthcare units (PHCUs) benefits students and can increase students' interest in GP^{23,24}. Experiential learning activities (ELAs) organized by medical schools have been widely used in PHCUs²⁵. The increased need for GPs is creating an emerging need for campaigns and actions to increase the percentage of graduates choosing GP as their medical specialty²⁶.

Arterial hypertension (AH) remains one of the leading modifiable causes of cardiovascular disease (CVD). The global burden of AH is estimated to 1.4 billion individuals, making AH one of the major causes of mortality and morbidity of adult patients, with more than 45 % of adults being undiagnosed²⁷. More than 7.5 million deaths each year are attributed to AH²⁸. While very effective therapies for AH have been developed, 40 % of hypertensive individuals remain untreated²⁹. Studies reveal low levels of awareness towards AH among medical students^{12,30,31}. Therefore, it is necessary to increase medical students' knowledge regarding AH. Moreover, due to the limited time in the clinical practice setting, blood pressure (BP) measurements are often omitted, and the diagnosis and control of AH is confined to fewer patients^{32,33}. An ELA could potentially increase medical students' awareness of

AH and show the feasibility of implementing regular BP measurements in everyday clinical practice. None of the published studies have proposed an ELA to raise awareness of medical students toward AH.

Qualitative analysis promotes expressing participants' feelings, opinions, and experiences. The different perceptions and personal experiences are expressed through open questions in the qualitative studies, allowing the researchers to understand the viewpoints of the participants deeply³⁴. This type of research does not confine the responses to already structured sentences developed by the researchers, allowing the expression of participants' inner thoughts³⁴. While this method provides the deeper thoughts and experiences of the respondents, a limitation is the need for a painstakingly time-consuming analysis, given that fact qualitative analysis is not feasible to be implemented in data obtained from large samples³⁴.

This qualitative study aimed to evaluate the impact, impressions, and thoughts of sixth-year medical students of the Medical School of Aristotle University of Thessaloniki (AUTH) who participated in an ELA regarding AH during their placement in PHCU. To our knowledge, this is the first study among medical students in Greece evaluating the impact of an ELA on AH.

Materials and Methods

Participants

The study was conducted between 06 November 2023 and 01 December 2023. The participants were 44 (100 % response rate) sixth-year medical students (final year of Medical School) who performed BP measurements on patients and visitors of PHCUs during their clinical clerkship of GP and PHC. All students agreed to participate in the study and signed informed consent. The study was approved by the Ethics Committee of Aristotle University of Thessaloniki (protocol No 3, date 16/01/2024).

The procedure of this ELA

Sixth-year medical students performed a four-week clinical placement in a PHCU in Greece during the GP-PHC class. All who have chosen to participate in the BP measurement ELA underwent an introductory briefing online training. Students were informed regarding the procedure (Figure 1) that should be followed during the measurements. During the online informative course, students were educated on patient-doctor communication and BP measurements per current guidelines³⁵. More specifically, a clinical hypertension specialist informed the students about the correct methodology of BP measurement, presented clinical and epidemiological data for AH,

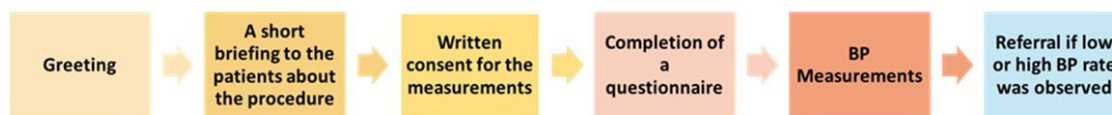


Figure 1: The procedure followed during blood pressure measurements by students.

BP: Blood Pressure.

and indicated how to fill in the questionnaire used to record the measurements. A short hands-on practical training was performed. On the first day, in cooperation with the academic and clinical staff, students chose a private space in each PHCU to perform the measurements. After completing BP measurements, patients were informed about the results of their BP records to discuss them with their family doctor. Students were alerted to inform the attending physician in case an individual exhibited extraordinarily high or low BP. The measurements were carried out in non-emergency patients and PHCU visitors for any reason, with or without a diagnosis of AH. During the effort, students were free from their clinical work in PHCU to carry out the measurements. Healthcare workers and managers of the units were informed for the action and were able to assist the students when it was considered necessary. Throughout the activity, all students could directly communicate with the ELA support team (online or via mobile phone) if they faced difficulties or had any queries. In Figure 2, we present images provided by students who participated in this ELA.

Data Collection

Final-year medical students were asked to fill out an online survey. The survey instructions were sent via the e-learning platform to the students who had taken part in this ELA to collect their opinions. The survey consisted of two parts: the first included questions about demographic data (name, biological gender, and the city/town where they performed their GP rotation), and the second was an open question. The open question of the survey was “*what are your experiences and thoughts on BP measurements you performed during your GP clinical clerkship?*” and participants were asked to express their feelings and points of view based on their experiences. Answers were collected via the AUTH e-learning platform.

Data Analysis

Braun and Clarke’s thematic analysis was used for the



Figure 2: Images showing blood pressure measurements by the sixth-year medical students participating in the experiential learning activity. Images are obtained with consent from the students and the patients.

analysis of students’ reports³⁶. The collected data were anonymized, and enumerated transcripts were utilized for the analysis. Two independent researchers proofread and re-read the transcripts to get acquainted with the data and a third researcher resolved all the conflicts. The initial codes were initiated using intriguing features that appeared in the texts. The codes were induced in themes that researchers created, and the data of the transcripts were inserted into suitable themes. A thematic map analysis was developed, and each theme and code was titled. A third independent researcher resolved conflicts. The researchers who implemented the qualitative analysis were chosen according to their experience in similar analyses in the past while they were familiar with these research topics.

Results

A total of 44 sixth-year medical students (24 females and 20 males) participated in the study. The qualitative statistical analysis revealed five main axes: benefits for students, patients, the health care system, facilitators, and obstacles to action (Figure 3).

Thematic 1: Benefits for students

Overall, significant educational benefits for the students emerged. Through the project, students came closer to their future “*role*” as doctors, gaining relative autonomy, which was reported as a “*novel experience for them*”:

“It was the first time I had direct contact with patients in the context of a clinic, without the simultaneous presence of a trainer; and I felt a little more like a “doctor” than a medical student” [Student No 10, female (F)].

“This exercise made me observe the patients while they are in the position of the examinee, and it seemed very useful to me” (Student No 29, F).

Many participants stated that the action offered a constructive combination of clinical practice and research methodology, helping them realize the value of properly following the blood pressure measurement algorithm:

“I realized the value of faithfully following the steps of the algorithm” [Student No 6, male (M)].

The BP fluctuations observed during the repeated measurements served as a significant motivation for students to thoroughly study the guidelines and factors that could lead to these variations during the action:

“It was particularly interesting to observe how the value of BP changed between measurements” (Student No 18, F).

This approach contributed to both experiential and theoretical learning. Importantly, students successfully collaborated with each other and with the PHCU personnel to manage emerging problems, both in technical matters (lack of space/ BP monitors) and issues related to patients. Additionally, they cultivated their communication skills with patients, encouraging their participation in the project, applying motivational interviews, and addressing hesitations:

“For approaching them, a brief dialogue of encour-

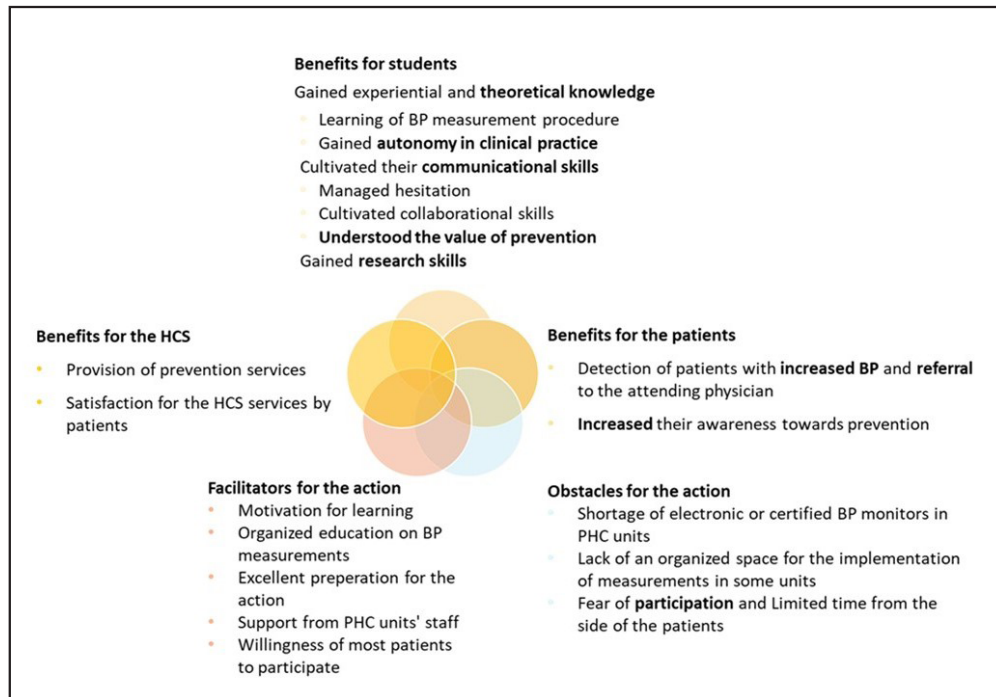


Figure 3: Scheme demonstrating the main themes and branches produced by the qualitative analysis.

HCS: Healthcare System, PHC: Primary Healthcare, BP: Blood Pressure.

agement, description of the project, and analysis of the importance of measuring their blood pressure for their own benefit were conducted” (Student No 13, M).

Moreover, the BP ELA in a PHCU highlighted the humanitarian aspect of practicing medicine to the students and reinforced their belief in the value of preventive actions. The students expressed an understanding of the role of primary healthcare services, recognized social inequalities that primary healthcare could mitigate, and confirmed the importance of prevention in the community:

“It strengthened my faith in the physician’s role and the PHCUs as preventive factors in ensuring community health” (Student No 36, M)

Thematic 2 and 3: Benefits for patients and the HCS

During the action, students identified numerous new cases of undiagnosed and uncontrolled patients with AH. Students received appreciation and positive comments regarding the action and its benefits from the participants. They felt that the patients recognized their role and the beneficial contribution of this ELA in the PHCUs. Additionally, students had the opportunity to discuss the value of AH prevention, the value of BP monitoring at home, the modifiable risk factors of AH, and the benefits of regulating BP to normal levels with each participant:

“Through the action, patients were effectively utilizing their waiting time in a productive manner” (Student No 25, M).

Overall, through the action, students recognized the value of prevention in the community and suggested regular BP measurements for the population in PHCUs.

“People’s education should be intensified, similar to the vaccination campaigns, in order to increase awareness about the importance of measuring their BP” (Student No 6, M).

Students, moreover, proposed upgrading the equipment of the PHCUs with certified BP measurement devices to achieve accurate measurements in the future, which would benefit both patients and healthcare professionals.

Thematic 4: Facilitators to action

Students who chose to participate in the action actively were motivated by the educational opportunities that were offered to them through this project. They considered the action an opportunity to practice proper BP measurements, study terms and definitions of AH, revise CVD risk factors, and actively contribute to prevention. A crucial motivator for their participation was the well-organized educational seminars by the academic personnel, which included detailed instructions regarding the BP measurement algorithm. Finally, the willingness of patients and the continuous support from PHCU’s staff were significant factors for the smooth execution of the action:

“It is worth mentioning the invaluable assistance of the trainers and all the staff of the PHCU. Their continuous support was of great importance for the smooth conduction and successful completion of the exercise” (Student No 20, F).

Thematic 5: Obstacles to action

Students encountered several obstacles during the ac-

tion. Some PHCUs lacked certified BP monitors, which, in several cases, were either absent or limited in numbers. Another problem was the shortage of organized space in some PHCUs. Additionally, some participants refused to continue and felt bothered by the repeated measurements due to time constraints or perceptions that so many measurements were “unnecessary” for the task. The students had to deal with the hesitation of the participants due to fear of measuring their BP. Those were the cases of individuals who did not regularly measure their BP and did not want to participate due to fear of the outcome.

Discussion

In the present study, we evaluated the impact of an ELA on sixth-year medical students during their four-week clinical placement in a PHCU. We conclude that most students declared that the project was a positive experience with several benefits: the meaningful regular preventive screening of asymptomatic individuals, the interesting and unexpected observations, and the successful student-patient engagement and interaction. According to the results of our study, a few students declared that the action was challenging to complete, mostly due to the “*not-ideal*” conditions. Our main five axes that emerged from the qualitative analysis were benefits for students, benefits for patients, benefits for the HCS, facilitators, and obstacles to action.

Cameron et al. conducted a similar study on fifth-year medical students during their rotation in a PHCU, reporting four major axes: “*expectations and the reality of primary care; service and learning; becoming a doctor; and making a difference*”. Our study reports similar results, emphasizing the importance of ELAs in medical education³⁷. In this study, we report positive feedback from our students. Hay et al evaluated the attitudes of medical students toward ELAs. The study reported a positive view of ELAs among medical students, which is consistent with the findings of our study³⁸.

In our study, multiple student benefits are reported, suggesting that ELAs are significant in several ways. Empathy, communication skills, strong patient connection, and personal satisfaction can be developed using hands-on learning projects in medical curricula^{39,40}. Community-based learning activities contribute to the improvement of both clinical and communication skills of future physicians⁴¹.

For the success of an ELA, patients’ cooperation is needed and should be encouraged. Patients’ engagement in clinical education should be empowered through a stronger collaboration among the PHCUs’ staff and medical students. It is also essential for patients to receive adequate information, comprehend the nature of their involvement, and respect the boundaries of confidentiality⁴². Our findings suggest that developing guidelines for students is essential for the success of the ELAs. Rockey et al conducted a study investigating patients’ overall experience of their engagement with medical students during their hospitalization. The patients’ reported refusal of

students to conduct physical examinations and diagnostic protocols prompts the need for alternative clinical teaching approaches, such as simulation-based training before the student-patient engagement^{43,44}.

Our study observes an increase in reported knowledge regarding BP measurements and AH. Several educational strategies have been implemented to improve students’ performance on BP measurements. Three different methods have been applied (Repeated Simulation-Based assessment, Flipped Classroom, approach with a self-instruction video, or an in-class session), producing satisfactory results in the knowledge level of medical students^{45,46}. For our action, the academic staff scheduled educational seminars before the beginning of the BP measurements in the PHCUs, with detailed instructions regarding the BP measurement algorithm. Students found these seminars adequate to enable them to cope with the action. Of course, it should be noted that our medical students were in the final year of their studies, with a basic experience in clinical examination. The implementation of BP measurement modules and hands-on skills sessions are well received by students and should be incorporated into every medical school curriculum, according to the study by Rakotz et al^{47,48}. The study by Ulusoy et al. noted that a significant number of physicians did not measure the reliable BP of their patients³².

Thus, introducing PHC ELAs that bring medical students closer to patients is necessary to introduce them to the importance of prevention and community services. Taking into consideration the low reported willingness of medical students to choose GP as their medical specialty and the lack of organized systematic teaching of GP courses in some Greek Universities, the effectiveness of such actions could potentially contribute to the organization of medical education in Greece by integrating the significance of PHC in medical students’ perceptions along with reforms in medical curriculums as well^{21,49}.

Strengths and Limitations

One of the strengths of this analysis is the open-question survey. This method increases the reliability of the answers that emerged from the analysis because respondents were not asked to fill in predetermined closed-type questions. However, they are allowed to express their thoughts and concerns about the action. The fact that students were in their final year of medical studies (6th year), enabled them to understand the benefits of the experiential education. The participating students shared the same level of training, comprising a homogenous sample, whereas they were distributed in many different PHC settings, enhancing the generalizability of the results.

A limitation was that the students were not supervised at all times during this activity, allowing for possible misconceptions or misinterpretations of circumstances and experiences. Moreover, the students may cope with some individual’s refusal to participate in the BP measurements, which should be taken into consideration in future similar activities. The qualitative design of this study and

the lack of statistical analysis and comparisons between groups are limitations as well. The analysis was implemented in 44 medical students, confining the generalization of the data. Indeed, future qualitative and quantitative studies in larger student cohorts can be developed.

Conclusions

Experiential education is a particularly constructive teaching tool with multiple benefits for students. The BP initiative contributed to developing students' autonomy and boosted their self-confidence. The action introduced a patient-centered nature of medicine to the students. It reinforced their belief in the value of prevention, with its benefits extending to the patients and the PHC system.

The high morbidity and mortality of hypertensive individuals underline the importance of their detection. AH can be easily diagnosed with reliable BP measurements that even medical students can implement. The increased workload of physicians in the clinical setting leads to the omission of the BP measurement of their patients. Thus, incorporating medical students in real-life clinical practice could be helpful. The potential benefits for medical students and patients support the idea that medical schools can incorporate similar ELAs into their curricula. Future studies could investigate whether this ELA could trigger a new cycle of learning and contribute to the diagnosis and better control of AH in the community.

Conflicts of interest

The authors declare no conflicts of interest.

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