

The impact of continuing education on physicians' performance at a sample of hospital institutions in Constantine, Algeria

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Abstract---This study examines the impact of continuing education on physician performance within hospital institutions in Constantine, Algeria. A descriptive research design was adopted, and data were collected through a structured questionnaire administered to a sample of 322 physicians. The collected data were analyzed using SPSS (Version 21), employing statistical techniques such as t-tests and regression analysis. The findings reveal a statistically significant positive relationship between continuing education and physician performance. However, the study also highlights notable limitations in financial and material resources allocated to continuing education programs, alongside generally average levels of Continuing Medical Education (CME) engagement and physician performance.

Keywords: CME, Continuing Education, Job performance, Physicians.

JEL Classification: I11, I18, J24.

1. Introduction

Education in our current era includes three sectors: undergraduate education, graduate studies, and continuing education (Swanwick, Forrest, & O'Brien, 2019, p. 3). This paper focuses on determining the impact of investment in continuing education on the physician's performance in a sample of hospital institutions in Constantine, Algeria.

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Investing in education is considered one of the methods of investing in human capital and is a serious practice in human resource management, which holds significant importance. What adds even greater importance is the study of this approach in the healthcare sector, focusing on the performance of physicians in healthcare institutions. In order to gain a comprehensive understanding of the topic in the medical field, we will focus on the continuing education that physicians receive, which is referred to as Continuing Medical Education (CME). Therefore, we will consider the two terms as two sides of the same coin, but with greater precision regarding the second term.

Continuing Medical Education (CME) which is a vital component of professional development for healthcare providers, particularly physicians. It includes a range of educational activities aimed at improving knowledge, skills, and performance in the medical sector. The significance of (CME) has increased markedly due to swift developments in medical science and technology, making continuous learning crucial for delivering the best possible patient care. (silk, et al., 2020)

The pressing requirement for continuing education among physicians is crucial, and its importance has intensified with the recent health developments brought about by the COVID-19 pandemic. Research and focus have shifted across various fields to find solutions to this issue, with a key area of exploration being how to enhance physicians' performance in combating this disease. In Algeria, it has become imperative for physicians to invest in the enhancement of their skills and knowledge to tackle the new challenges introduced by the pandemic. The impact of the pandemic on the healthcare system has been significant, requiring specific preventive measures to ensure the safety of patients and healthcare staff. These educational initiatives are vital for improving the healthcare system's ability to respond to challenges arising from pandemics and for ensuring that patients receive optimal care.

There were many studies in the literature, which examine the impact of (CME) on the job performance, for example a study about the Continuing Medical Education effect on practice performance: effectiveness of continuing medical education, American College of Chest Physicians Evidence-Based Educational Guidelines, a qualitative content analysis study (2009) which concluded that (CME) is generally effective in changing physician performance, and an improvement in the performance of physicians was observed, particularly in the areas of screening, prescriptions, and other topics (Davis & Galbraith, 2009) (Zarei, Mojarab, Bazrafkan, & Shokrpour, 2022).

Also, another study about synthesize the systematic review literature about (CME) effectiveness published since 2003 under title of The Impact of CME on Physician Performance and Patient Health Outcomes: An Updated Synthesis of Systematic Reviews reach some results the most important of it is: (CME) does improve physician performance and patient health outcomes and the (CME) has a more reliably positive impact on physician performance than on patient health outcomes (Cervero & Gaines, 2015), moreover (Vendruscolo, et al., 2020) showed that Continuing education emerges as a potential for the successful collaborative work among teams and between the teams which play a role of improving performance, furthermore, Sirková, Ali Taha and Ferencová (2014) found that employees generally perceive positively the continuing education and see its benefits for themselves.

In addition, Education influences their career development, assessment, motivation and interpersonal relationships. As the main benefits of continuing education respondents, one indicates: the acquisition of new information, self-development, acquiring new contacts and a new perspective on the issue. (Sirková, Ali Taha, & Ferencová, 2014), and these results are consistent with the results of their second study, which was about the continuing education and development of employees in enterprises (Sirková, Ali taha, & Ferencová, 2014). A different study conducted in India emphasized the necessity for continuing education (CE) programs due to the swift advancements in technology, evolving job requirements, and the expanding knowledge. (Harake & Hadagali, 2015).

The study aimed to determine the impact of continuing education on physicians' performance at a sample of hospital institution in Constantine, and the following hypotheses were formulated as they align with the research objectives:

H1: There is a positive level of continuing education in the hospitals under study.

H2: There is a positive level of physicians' performance in the hospitals under study.

H3: there is an impact of continuing education on the physicians' performance in the hospitals under study.

2. Theoretical Framework

2.1. The Definition of Continuing Medical Education

Before delving into the definition of continuing education, it is worth noting that education, in general, within the framework of human resource management, is defined as: "a process aimed at enhancing the ability to adapt to the work environment, the position, and task completion, which includes educating individuals both theoretically and practically to qualify them by enhancing and developing their competencies" (Peretti, 1999, p. 17).

Continuing Medical Education (CME) is also considered an intrinsic element of medical practice and part of the self-image and professional duty of physicians, as well as an important strategy in human resource management within healthcare institutions. It is defined as the continuous improvement of abilities and skills to achieve greater quality in treatment methods, with the aim of ensuring the provision of optimal medical care for patients, i.e. It is a purposeful and planned educational process and activity aimed at equipping healthcare practitioners with the necessary knowledge to achieve professional growth and the required professional education activities to enhance work effectiveness. It also aims to acquire appropriate professional abilities and skills to strengthen the relationship between physicians and patients. Continuing medical education includes a focus on knowledge, skills, clinical guidelines, and general healthcare rules (Luo, Hu, Xu, & Wang, 2018).

Moreover, it refers to the various methods and means through which physicians learn a range of new knowledge, abilities, and skills after the formal completion of their academic education at universities and medical colleges (Reis, Faria, Serra, & Xavier, 2022). Also, the main objective of medical education is often referred to as the redistribution of knowledge to generate shared wealth, with the aim of restructuring and enhancing performance (Bleakley, 2015). And he indicates that work-based medical education (which encompasses undergraduate studies and the early training years for new doctors in hospitals) represents the most significant and impactful factor in the performance of healthcare providers. Additionally, this performance is greatly influenced by the effectiveness of educators and clinical teaching teams.

Based on the above, continuing medical education, is a planned activity with an educational nature characterized by continuity which aims to equip physicians with new knowledge and skills that align with emerging epidemics and new medical conditions to ensure the renewal of knowledge, enhance the physician's competence, and improve treatment outcomes through various methods, including training courses and theoretical learning such as lectures.

2.2. Content of continuing medical education

Given that, the primary purpose of continuing medical education is essentially continuous improvement and education to help physicians address gaps in their professional practices, this reflects the fact that of continuing Medical education (CME) not only pertains to aspects related to a physician's specialized knowledge but also extends to other areas that affect the quality of treatment outcomes and healthcare. Therefore, the study of (German Medical Association, 2015) indicates that continuing education

includes teaching specific, multidisciplinary topics and functional knowledge related to diseases, symptoms, outcomes, diagnostic methods, clinical images, and medical treatment, in addition to consulting with consideration for new scientific findings and medical procedures. It also aims to enhance the physician's competence regarding communication, collaborative skills, leadership, and medical decision-making, as well as risk management, patient safety, increasing awareness of self-care, and more.

Furthermore, In an applied study conducted by Combes & Arespacochaga (2014) to investigate the contents of continuing medical education undergone by the sample studied, they found that the largest percentage representing the majority of topics included in continuing medical education was related to specialized knowledge at 54%, This was followed closely by leadership development and quality and professional safety, each accounting for 18%, The remaining 10% included education on professional ethics at 4%, the same percentage allocated to learning electronic medical recordkeeping, and 2% for learning about the International Classification of Diseases (Combes & Arespacochaga , 2014).

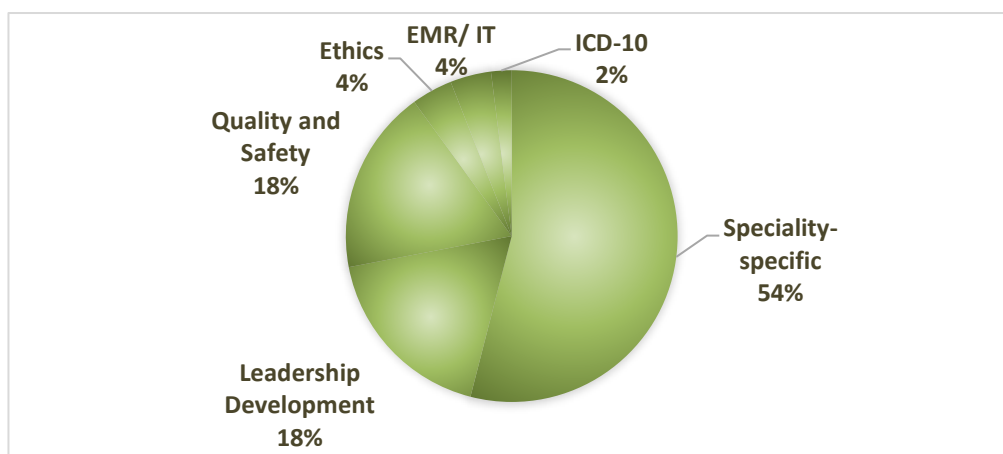


Fig.1. Continuing medical education topics
Source: (Combes & Arespacochaga , 2014, p. 8)

Therefore, we conclude that continuing medical education is not limited to enhancing skills and knowledge but extends to all aspects that can improve physicians' professional behavior, This comprehensive approach is expected to ultimately contribute to better patient care, enhance healthcare outcomes, and improve the overall effectiveness of the healthcare system.

2.3. The Employee Performance

To begin with, before exploring the key definitions related to employee performance, it is important to highlight a significant point: there are synonymous terms for this variable that carry the same meaning. Research has shown that employee performance is also referred to as job performance and individual performance, indicating that these terms are interchangeable. (Sabri, Küçükaltan, & Musa, 2017, p. 177). Job performance is defined as the ability of employees to consistently achieve the individual tasks assigned to them, which fulfill the objectives of their employment. Riandi & Sitorus (2021) noted that performance is the result of employee behavior and the work accomplished over a specific period, in addition to completing tasks and responsibilities (Riandi & Sitorus, 2021, p. 217). This definition aligns with what Setyo, Endri, & Herlisha (2021) presented when they stated that performance refers to the role of employees in fulfilling the obligations outlined in the formal contract granted to them by the

organization. This performance is divided into two important components: task completion and individual behavior. (Setyo, Endri, & Herlisha, 2021, p. 165)

In addition, job Performance is defined as:” the total results achieved by an individual as a result of their efforts, utilizing their skills, knowledge, and opportunities to execute the tasks and duties required by their position” (Hammed, 2021, p. 26).

Based on the definitions reviewed, we can say that performance refers to the results achieved by an employee, which stem from the individual's capabilities, skills, effort, and behavior directed towards completing the tasks assigned to them as required by their position in order to serve and achieve the established organizational goals. Consequently, we can define the physicians' performance as the collective efforts that materialize in the form of outputs achieved by members of the medical team, based on the activation of their scientific knowledge and the utilization of their abilities and skills according to the requirements of their positions.

3. Materials and Methods

This quantitative study was conducted at a sample of hospital institutions in Constantine, Algeria, targeting a number of physicians working in these hospitals.

A random sample for the study was determined using the American Educational Association, and the results are as follows:

$$n = \frac{X^2 \cdot N \cdot P(1 - P)}{D^2 \cdot (N - 1) + X^2 \cdot P(1 - P)}$$

- **n** is the sample size;
- **N** is the population size;
- **P** is the estimated proportion for the study, with a chosen proportion of 50% to achieve the largest possible sample size;
- **D** is the allowable margin of error, estimated at 5%;
- **X²** is the chi-square value at a confidence level of one degree of freedom, estimated at X²=3.841.

Due to the impossibility of collecting data from all 16 hospital institutions in the Wilaya of Constantine, 05 hospital institutions were selected. A questionnaire for the study was distributed to their physicians, resulting in a sample size of (322) physicians out of a total of (**N** =787) physicians. A descriptive cross-sectional study was conducted. In order to achieve the study objectives. The study questionnaire divided into 3 domains: the first part included 3 questions relating to the socio-demographic data of respondents. In the second part, questions on the of continuing medical education (CME), while the third part was relating whether (CME) affect physician performance. All items used to measure incentives and performances from the physicians' view were captured on a five point Likert scale. The scale used ranged from 1= very strongly disagree to 5 = very strongly agree. Ware package for social sciences (SPSS) was used to analyse the data by repetitions, percentages, arithmetic means and standard deviation, T- test, linear regression model, was considered as statistically significant at level (0.05) or less.

4. Results

4.1. Demographic Variables

The majority of the study sample comprises females, totaling (206), which accounts for (64%). In contrast, males make up (36.0%) of the sample, with a total of (116) physicians. Were the age group of

[30-40 years] makes up (40.1%) of the sample, representing (129) physicians. Following this, individuals aged [40-50 years] rank second, with 82 physicians, which corresponds to (25.5%). The third position is held by those under 30 years old, totaling (72) individuals and accounting for (22.3%). Lastly, individuals over (50) years old represent (12.1%) of the sample, with a frequency of (39) individuals.

Data show the majority of respondents were physicians with [5-10 years] of work experience, accounting for (171) responses, which represents (53.1%), surpassing the halfway mark. The second position is occupied by those with less than 5 years of experience at (19.9%). The third and fourth positions are held by individuals with [10-20 years] and over 20 years of experience, respectively, showing frequencies of 44 and 43. Their percentages are quite close, at (13.6%) and (13.4%), respectively.

4.2. Continuing Medical Education

The arithmetic mean for the continuous medical education axis was 3.10, while the standard deviation was estimated at (0.719). This indicates that the level of Continuing Medical Education (CME) in the hospital institutions under study is average. The standard deviation reflects the degree of dispersion in the responses of the sample individuals regarding the items in this axis, which was also average. Based on this, we will proceed to analyse each statement individually:

The statements in the continuous medical education axis recorded agreement levels that varied between "disagree" and "agree." The recorded arithmetic means for the items in this dimension ranged from **2.13** to **3.71**, reflecting responses to statements (Q5) and (Q3), respectively. In second place, after statement (Q3), which indicates that the hospital institutions under study strive to provide educational courses and lectures related to their physician's specialties, is statement (Q9) with a mean of **3.53** and a dispersion degree of **1.023**. This expresses the reality of medical students' education through their guidance by senior doctors to supervise them and enhance their knowledge in their specialties, reflecting the state of medical education for students in Algeria through supervisory methods. Following closely, statement (Q2) ranked third with a high level of agreement, achieving a mean of **3.52** and a standard deviation of **1.248**, indicating a relative consensus that hospital institutions encourage physicians to participate in seminars and conferences related to their practice. This is evidence of their adoption of seminars and lectures as part of the educational process. For statement (Q6), it also received an "agree" rating with an arithmetic mean of **3.48** and a dispersion degree of **1.149**, placing it fourth. This indicates that hospital institutions have qualified and specialized human resources to teach novice doctors, supporting what was stated in statement (Q2).

Regarding the average levels of agreement, three statements were included: (Q4), (Q7), and (Q8), which ranked fifth, sixth, and seventh, respectively. Their arithmetic means were estimated at **3.23**, **3.19**, and **2.72**. This reflects that the encouragement of hospitals for doctors to engage in research and development activities is moderate. Additionally, the educational courses provided by healthcare institutions, according to the perspective of the sample individuals, are not continuous, as indicated by the neutral responses recorded for statement (Q7). Furthermore, statement (Q8) revealed a neutrality in individuals' responses regarding whether healthcare institutions provide specialists for new cases to clarify treatment methods relatively.

In the last two ranks, specifically the eighth and ninth positions, statements (Q1) and (Q5) achieved arithmetic means of **2.41** and **2.13**, with standard deviations of **0.875** and **0.871**, respectively. This reflects a level of disagreement regarding these items, indicating that the hospital management does not actively work to enhance the knowledge of the physicians' members. Furthermore, the hospital institutions lack specialized units for monitoring and generating ideas, based on the viewpoints of the individuals in the studied sample, and this is illustrated in the following table:

Table 1. Average scores and standard deviations of responses on continuing education

Question Number	Mean	Standard Deviation	Ranking	Direction of the Answer
Q1	2.41	0.875	8	low
Q2	3.52	1.248	3	high
Q3	3.71	0.968	1	high
Q4	3.23	1.250	5	average
Q5	2.13	0.871	9	low
Q6	3.48	1.149	4	high
Q7	3.19	1.174	6	average
Q8	2.72	1.113	7	average
Q9	3.53	1.023	2	high

Source: study data.

Conversely, a one-sample T-test was conducted to assess the level of continuing education in the hospitals being studied, and the results are presented in the table below:

Table 2. Results of the T-test Continuing Medical Education level

Variable	Mean	Standard deviation	T Calculated value	T Table value	Morale level	Sig
CME	3.10	0.719	2.693	1.960	0.05	0.007

Source: study data

For continuing education, the mean score was (3.10), which is higher than the hypothesized mean (3). Additionally, the T value is 2.693, which is greater than the critical T value, and the significance level is lower than the studied significance level. Therefore, the level of continuing education in the hospitals under study is considered positive from the perspective of the sample and the H1 correct.

4.3. Performance

In general, the axis of physicians' performance recorded an average level in the responses, with an estimated arithmetic mean of 3.20 and a standard deviation of 0.655. Meanwhile, the response trends regarding the items in this axis ranged between "disagree," "neutral," and "agree."

Statement (Q21) ranked first with a high arithmetic mean of **4.13** and a standard deviation of **1.064**, indicating that the physicians possess the ability to communicate effectively with patients. In second place was statement (Q20), which recorded an arithmetic mean of **4.03** and a standard deviation of **1.014**, confirming that the staff provides assistance to patients when needed, even during their breaks. Statement (Q17) came in third with a high arithmetic mean of **3.90** and a standard deviation of **1.030**, reflecting a relative degree of dispersion in the responses, indicating that the physicians' members in the healthcare institutions under study are open to advice and guidance from those more competent than themselves. As for statement (Q18), it ranked fourth in the performance axis of the physicians, with an arithmetic mean of **3.84** and a standard deviation of **1.070**, reflecting the physicians' awareness of the importance of cooperation among themselves and sharing their knowledge to enrich their collective expertise. Statements (Q16) and (Q15) occupied the fifth and sixth positions, respectively, being the last two statements regarding agreement in responses, with arithmetic means of **3.71** and **3.60** and dispersion degrees of **1.093** and **1.089**. This indicates that the physicians' members possess adequate skills and knowledge that enable them to make decisions in their field and complete their tasks efficiently and on time.

Regarding the level of neutrality, it was recorded in statements (Q13) and (Q12), which achieved average arithmetic means of **3.20** and **2.96**, with standard deviations of **1.196** and **1.147**, respectively, placing them in the seventh and eighth positions. This reflects a neutral stance in the responses regarding the physicians' ability to perform their tasks, which may be attributed to a lack of prior training or continuous education. Additionally, the neutrality in responses concerning the physicians' awareness of the methods used by healthcare institutions to measure their performance is also notable.

Regarding the statements that recorded a "disagree" level, they are statements (Q14), (Q10), (Q11), and finally (Q19), which occupied the ninth, tenth, eleventh, and twelfth positions, respectively. Their arithmetic means were **2.45**, **2.23**, **2.19**, and **2.18**. This indicator suggest that the physicians lacks the ability to generate new ideas that could impact work methods and task execution. Additionally, there are negative reactions toward working extra hours, and the compensation received by the physicians is not sufficient to motivate them to achieve the goals of the healthcare institutions, and his explanation can be summarized in the following table:

Table 3. Average scores and standard deviations of responses on physicians' performance

Question number	Mean	Standard deviation	Ranking	Direction of the answer
Q10	2.23	0.946	10	low
Q11	2.19	0.912	11	low
Q12	2.96	1.147	8	average
Q13	3.20	1.196	7	average
Q14	2.45	1.188	9	low
Q15	3.60	1.089	6	high
Q16	3.71	1.093	5	high
Q17	3.90	1.030	3	high
Q18	3.84	1.070	4	high
Q19	2.18	1.149	12	low
Q20	4.03	1.014	2	high
Q21	4.13	1.064	1	high

Source: study data

Also, a one-sample T-test was conducted to assess the level of performance in the hospitals being studied, and the results are presented in the table below:

Table 4. Results of the T-test performance level

Variable	Mean	Standard deviation	T Calculated value	T Table value	Morale level	Sig
Performance	3.20	0.655	5.660	1.960	0.05	0.000

Source: study data

Based on the table, it is clear that the performance variable, which represents the dependent variable in the study, recorded a mean score of (3.20), which is relatively higher than the hypothesized mean (3). Additionally, the standard deviation was (0.655), and the calculated T value was greater than the critical T value, with a significance level also lower than the alpha level (0.005). Therefore, we accept the hypothesis (H2), which states that: the performance level of physicians is positive in the hospitals under study.

In order to test the impact hypothesis, a regression test was used, and the results are as shown in the following table.

Table 5. Results of the regression of the impact of Continuing Medical Education on physicians' performance

Model	Atypical transactions		Transactions stereotyping	T Calculated value	sig
	A	Standard error	Beta	-	-
Constant	0.666	0.154		4.136	0.000
CME	0.793	0.046	0.740	17.082	0.000

Source: study data

Following the regression analysis, it was determined that the calculated T value exceeds the critical T value, and the significance level of (0.000) is below the studied alpha level. This indicates that continuing education significantly impacts physician performance. The correlation coefficient was found to be (0.740), suggesting a positive relationship between continuing education and physician performance. Moreover, the coefficient of determination was (0.548), implying that (54.8%) of the variation in the dependent variable (physician performance) can be attributed to changes in continuing education, which serves as the independent variable in this study. The remaining percentage is linked to other variables not considered in the study model. i.e. after recording a positive and average level of (CME) and job performance on the hospital institutions, we record also a positive and significant relation was found between (CME) and physician performance level ($r = 0.740$, $r\text{-two} = 0.548$) at the level of significance 0.05 and the hypothesis (H3) is correct.

5. Discussion

This study was conducted to investigate the impact of continuing education on the performance of physicians in a sample of hospital institutions in Constantine. Several studies have covered the same topic; however, studies on this subject in the healthcare field have been somewhat rare, especially in Arab countries. In the current study, it was found that continuing education has an effect on the performance of physicians in the hospitals under study, which aligns with the results obtained in previous studies mentioned in the introduction of this research. Despite this result, there are some recorded deficiencies, such as a lack of facilities for generating ideas and problem-solving in hospitals. Additionally, the individuals in the studied sample responded negatively to whether their hospitals work to enhance their knowledge, which can be attributed to the fact that the hospitals under study are government hospitals with limited budgets that may not be sufficient to achieve continuous education and ensure its outcomes and effects on performance.

Another factor contributing to the statistical analysis results indicating that the sample members' responses to performance items were at an average level is that not all of them had access to continuing education. This issue can be traced back to the same underlying cause: the insufficient budget allocated for continuing education.

6. Conclusion

The study viewed the impact of Continuing Medical Education on physicians' performance and concluded that there was a close link between the (CME) provided at hospital institutions under study and the performance of physician. In summary, Continuing Medical Education is essential for physicians aiming to maintain competence and improve their performance. By engaging in accredited (CME) activities, healthcare professionals can enhance their skills, adapt to new medical knowledge, and

ultimately provide better care for their patients. The ongoing commitment to education through (CME) is critical in an ever-evolving medical landscape.

7. Recommendation

- To enhance decision-making and improve daily work problem-solving, it is essential to establish dedicated spaces for generating creative ideas and innovative approaches.
- Increasing the financial allocations provided by the government to support continuing medical education is crucial. These financial allocations should be subject to oversight regarding their expenditure.
- Aiming to emulate successful international experiences in medical education to further enhance and improve job performance.
- To encourage physicians to learn and improve their outcomes, it is essential to link promotion opportunities with the necessity of continuing education.
- It is important to emphasize that the nature of healthcare institutions differs from other organizations, which is why we recommend that management be conducted by medical practitioners. They are more familiar with the conditions of healthcare institutions, as they are on the ground more than just administrators.
- Establish partnerships with foreign educational institutions and also open collaborations with successful private hospitals that utilize continuing education to enhance the efficiency of their human resource outputs.

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