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Original Article

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Faculty Development Program and the Outcome of Academic Development

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Abstract

Background: Faculty Development Programs (FDPs) aim to improve the academic careers of faculty members. This study was designed to assess the attitudes of faculty members and the impact of FDP on their academic improvement.

Methods: 12 faculty members took part in the research from 2016 to 2019. Using a Delphi method, an open secure questionnaire was provided to 12 junior faculty members in the Department of Anesthesia, Critical Care (DACC), Shahid Beheshti University of Medical Sciences (SBMU), Tehran, Iran. Then, the keywords of the latter were analyzed, leading to a 32-item closed-answer questionnaire, filled out by the same participants. Also, the impact of the study was assessed using bibliometric improvement indices.

Results: Both the response rate and participation rate were 100%. Approximately all the participants considered FDP an advantageous and promising academic program. 65 percent of the participants had academic improvement, from "Assistant Professor" to "Associate Professor" rank. Besides, the cumulative number of citations to the participants had a 16.2 times improvement. Both latter results were significantly higher than the mean improvement of the cohort faculty members in the DACC, SBMU.

Conclusion: Faculty members of DACC, SBMU had positive attitudes towards FDP and described it as "a well-designed multilateral academic teamwork, thriving ethical, educational, managerial and research-related capacities". Also, objective improvement in some academic indices was observed. In many academic environments including developing countries, FDPs are effective scientific investment methods.

Keywords: Anesthesia, Bibliometrics, Critical care, Delphi technique, Developing countries, Formycin diphosphate, Humans, Iran, Optimism, Questionnaires, Surveys

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Introduction

Faculty Development Programs (FDP) are placed to recruit, retain, and develop the highest faculty scholar and professional activities (1-3). However, the FDPs and "teaching the teacher courses" will affect the personal and professional behavior of the faculties (2,4-7). Despite many studies performed in the field of FDP, more studies are required to assess the effect of FDP on educational outcomes (1,2,8-10).

On the other hand, there is a list of specific challenges in developing countries when dealing with FDP; areas such as the educational materials and the components of the FDP course, cultural issues, the sustainability of the course, language and English communication, selection strategies, learning environment, needs assessment, relevance, acceptance, and difficulties in extrapolating the learned patterns to the primary academic environment and cost-effectiveness (11-16).

This research was planned to be used as feedback for future programming regarding the academic activities of the junior faculty members, considering the challenges of such an academic approach in a developing country (17); while the primary goal of this study was to assess the attitudes of junior faculty members with regard to the effect of a departmental FDP on their scholar activities, three years after passing the FDP course. Besides, this wanted to assess the impact of the FDP course on the academic improvement of the participants. This medical education research was performed in the Department of Anesthesiology and Critical Care (DACC), School of Medicine, Shahid Beheshti University of Medical Sciences (SBMU), Tehran, Iran.

Materials and Methods

The study was approved by the Institutional Review Board (IRB), the research ethics committee, Deputy of Research, SBMU; coded IR.SBMU.RETECH.REC.1399.463.

To assess the attitudes of junior faculty members, at DACC, SBMU, we designed a descriptive attitude assessment study using both qualitative and quantitative methods. The qualitative part of the study included an open-question interview; while the quantitative part of the study was comprised of an attitude assessment closed questionnaire. The study started in late 2016 and ended in early 2019. The selection criteria were those attending physicians who had entered their academic career in the last 5 years. The interval between their last day of the program and the time of the interview was 6 weeks. All the participants were selected and none were reluctant to participate in the anonymous answering of the study questions. There were 65 faculty members in 2016 in DACC, SBMU, with a male/female ratio of 40/25 in nine academic medical centers. Six senior members have retired while eight junior ones have been added as new faculty members; they entered DACC, SBMU after the study was started; thus, they were not included in this study. As mentioned, only faculty members under the age of 40 entered the project; while at the time of starting this project, there were 20 faculty members under the age of 40; among them, 12 entered the study.

The study was mainly in the 2nd level of the Kirkpatrick pyramid (*i.e.*, Level 2: Learning). The chosen model and the obtained products are described as 3 distinct phases.

1. The co-thinking and consultation phase
2. The design phase (including the FDP course plan)
3. The attitude assessment phase (the qualitative and quantitative attitude assessment phases).

The co-thinking and consultation phase: the junior faculty development program of DACC, SBMU began after conducting a needs assessment in a preliminary steering committee and final approval by the Executive Council of the Department; the latter council consists of the Chair of DACC, SBMU, and Vice Chairs for Educational Affairs and Research Affairs. This phase started in late 2016, and continued till the end of the study; *i.e.*, the final results were presented to the Executive Council of the Department.

The design phase (including the FDP course plan): started from the early days of the study (*i.e.*, from late 2016) and maintained as the scientific arm of the study until the final days (*i.e.*, early 2019); based on the international experiences added with any local and national similar ones (2,3,12,18).

Regarding the content of the FDP course, the FDP was held fully in English; while the native language of the faculty was Farsi. These topics were categorized

under the following main titles:
- Academic management
- Academic performance
- Ethics in the academic environment
- Conflict of interest management
- Scholar development for faculty members
- Basic Principles of scientific writing
- Principles of medical education for a junior faculty member
- Interdisciplinary and international work
- Team working and Teamwork learning

A part of the FDP course in DACC, SBMU included 22 sessions (4 *hr* each). Over 120 topics with a total number of 135 handouts, exercises, and surveys were provided by the instructor to the participants; added with 48 educational videos. The total length of the course was 22 weeks; based on the availability of the faculties, it took 3 years to finish all the educational courses. Besides, at the time of starting the FDP in DACC, SBMU, only those faculty members under the age of 40 entered the study. We had to arrange only 12 individuals for 12 seats in this FDP; therefore, we used "40 years' age" as the cutoff for prioritizing the faculty members. These "below 40 years" faculty members were considered junior faculty members by the definition of the study.

The attitude assessment phase (the qualitative and quantitative attitude assessment phase): was started in early 2018 and ended in early 2019. After finishing the course, to take the feedback of the junior faculty members, in the first step, the qualitative part of the research was started (19); for this purpose, the goals were prepared and designed as 4 main open questions by one of the authors (*i.e.*, AD) (Table 1); which were proposed to the faculty members; all of them agreed to respond through a written private interview, performed by the same author (AD); the interview was tried to be a semi-structured one (20, 21). The 4 questions in table 1, were designed as open ones; except the 3rd one which was a closed question; since it was an introductory question for asking the 4th question. To improve the evaluation design, although the course and the evaluation were performed by the same person, the evaluation process was performed blindly to prevent potential biases.

Besides, to perform the interviews (*i.e.*, the qualitative arm of the study), we tried to follow the main tips for qualitative research, including those mentioned in some previous articles (20-22). Also, we used thematic analysis for data analysis and interpretation, using a similar model involving anesthesiologists in a semi-structured interview study (23).

The results of this open-question interview were analyzed and used to retrieve the related keywords using the whole interview texts; these keywords are listed in table 2.

The keywords and phrases were rated by the same faculty members who had participated in FDP; to do so, they were asked to express their attitudes regarding the effects and influence of FDP keywords throughout the 3 years after the course on their scholar activities, weighing from 1 to 10; while 1 demonstrated the least effect and 10 demonstrated the highest weight. The highest possible rate for each of the 32 keywords was 120 (12 potential respondents).

However, for assessing the impact of the study, two distinct bibliometric improvement indices were used: The cumulative number of citations to the participants using the Scopus® database compared with the cohort faculty members in the DACC, SBMU. The academic improvement, from "Assistant Professor" to "Associate Professor" rank compared with the cohort faculty members in the DACC, SBMU

Table 1. The open questions proposed to the participants of the study

1. If we could define the FDP just as one sentence, how would you define it? Describe
2. In your opinion, which advantages and/or disadvantages resulted from FDP? Provide at least 2-3 potential items
3. Do you think the FDP could lead to improvements in your academic function? Yes or No
4. Please explain your rationale if your answer to question 3 is Yes

Table 2. Keywords and phrases retrieved throughout the texts of the interview ordered alphabetically and the cumulative results of faculty members' attitudes regarding the effects and influence of FDP titles on their scholarly activities throughout the 3 years after the course

1. Academic management
2. Academic performance
3. Academic leadership
4. Analysis and comparison
5. Clinical duties
6. Conflict of interest management
7. Copyright
8. Creative thinking
9. Critical thinking
10. Departmental development
11. Departmental motivation (how to motivate academic department members)
12. Ethics in academic activities
13. Ethics in the work environment
14. Exclusive use of the English language
15. How to prepare a poster for international sessions
16. Innovation in teaching and learning
17. Interactive homework
18. Interdisciplinary academic work
19. Learning how to do an international collaboration
20. Mentoring in medical education
21. Pedagogic and adult learning
22. Peer review
23. Personal motivation (how to be personally motivated in an academic atmosphere)
24. Plagiarism
25. Positive competitive environment
26. Poster presentation
27. Role modeling and how to inspire it
28. Scientific writing
29. Teamworking and promoting teamwork
30. Team-based leadership
31. Team conflict management
32. Teamwork learning (collaboration in research, education, and academic/professional affairs)

This table of keywords was listed in an alphabetically ordered word file table.

The method for conducting the interviews

To answer the open questions, the participants received an anonymous open questionnaire (Table 1) and answered the questions using free space to answer. Then, the keywords were retrieved and sorted based on the answers to the open questionnaire (Table 2). Then the latter table was rated anonymously by the respondents. There were no verbal interviews. Since there was no previous experience in the DACC, this study was assumed as an inductive content analysis; while the themes were extracted based on the main related teaching sessions (Table of contents used for the teaching sessions).

Statistical analysis

Data entry and analysis were performed using SPSS software (version 11.5; SPSS Inc, Chicago, IL, USA). For analyzing the more advanced psychometric indices and questionnaires, eigenvalue and factor analysis were utilized. Also, a student t-test was used to compare the results of cumulative citations. The chi-square test was used for analyzing the "academic rank" analysis. $p<0.05$ were considered statistically significant.

Results

As mentioned, only faculty members under the age of 40 entered the project; while at the time of starting this project, there were 20 faculty members under the age of 40; among them, 12 entered the study. The calculated response rate was 100%; also, and the participation rate was 100%. The qualitative results of the study (the results of the semi-structured interview analysis): Among the responses to question 1 from Table 1 (*i.e.*, the interview), the following items were retrieved from the respondents' own words:

- Well-designed academic team working (11 of 12 respondents)
- Widespread promotion of academic activities (10 of 12 respondents)
- Multilateral academic thriving for a junior attending (10 of 12 respondents)
- Widespread research training course (9 of 12 respondents)
- Training junior attending in scientific writing (8 of 12 respondents)
- The informative course on ethics and moral aspects

for academic affairs (8 of 12 respondents)
- A course in training academic management to junior faculty (6 of 12 respondents)
Regarding question 2 (Table 1), the most common responses about the advantages and disadvantages of the course were mentioned as follows.
The most common responses towards the advantages of the FDP:
- Creating novel interactive academic discussions for our daily needed tasks (12 individuals)
- Teaching and practicing teamwork (10 individuals)
- Exclusive use of English language throughout the course (9 individuals)
- Managing and practicing inter-individual interactions in a friendly environment (8 individuals)
- A systematic approach intermingled with order and definite goals was used throughout the course (7 individuals).
The most common responses towards the disadvantages of the FDP:
- No specific disadvantage (12 individuals)
- Needed more detailed supplementary courses specifically designed for some items (7 individuals)
- There were some time conflicts with the daily clinical duties of junior faculty members (4 individuals)
- The high volume of homework (2 individuals).
All junior faculty members responded "yes" to question number 3 in Table 1; in other words, they believed that FDP had significantly led to improvements in their academic function.
In the quantitative arm of the study (the attitude assessment arm), all the junior faculty members took part in rating the 32 items in table 2. From this list, the highest score was related to "No. 13: Ethics in the work environment" and "No. 23: Personal motivation (How to be personally motivated in the academic atmosphere)"; while the lowest score was for "No. 5: Clinical duties".
Some empirical results regarding scholarly activity as a desired outcome of the study could be mentioned here: all those who participated in the FDP were "Assistant Professors" at the start time of the study; however, currently, six of them have been promoted to Associate Professor Rank (*i.e.*, 50%); and three others have been able to request and start their promotions, based on their scholar activities.
The impact of the FDP on academic improvement demonstrated the following results:
- The cumulative number of citations to the participants using the Scopus® database compared with the cohort faculty members in the DACC, SBMU had a 16.2 times improvement (p-value <0.05)
- The academic improvement, from "Assistant Professor" to "Associate Professor" rank had a significant difference compared with the cohort faculty members in the DACC, SBMU; *i.e.*, 65 percent of the participants had academic achievement from "Assistant Professor" to "Associate Professor" rank (p-value <0.05).

Discussion

The results of this study revealed that faculty members of DACC, SBMU had overall positive attitudes toward the FDP courses. Besides, based on the analysis of the 1st question in table 1, they uttered that the course could be shortly described as "a well-designed multilateral academic teamwork thriving ethical, educational, managerial and research-related capacities". Studies have pointed out that the development of attitudes can be facilitated by providing a conducive atmosphere and models (2, 4-7,10). The cumulative results related to the attitudes of junior faculty members towards departmental FDP were in concordance with the goal of FDPs as a strategic pathway to continuously provide the necessary resources to build a successful, enjoyable, and highly productive career. Hence, the results of the current study support that FDP, DACC, SBMU fulfilled the vision of this broad-range process which was to assist the faculty members in improving their academic capacities and roles; especially when considering the rapid trend of development in medical sciences (24,25).
The quantitative scores towards questions in table 3 were in concordance with the qualitative analysis of answers to table 1; *i.e.*, different topics in table 2 were rated differently and those topics related to one of the following issues were rated more than the others:
- Ethical aspects of scholarship activities (both in academic activities and in the work environment; items 12 & 13 in table 2)
- Novelties in teaching and learning including innovations and mentoring (16 & 20 in table 2)
- Principles of team working; both promotion of

Table 3. The scoring results of "Table 2" by faculty members

1. Personal motivation (how to be personally motivated in an academic atmosphere)	120
2. Ethics in the work environment	120
3. Mentoring in medical education	119
4. Ethics in academic activities	118
5. Teamwork learning (collaboration in research, education, and academic/professional affairs)	118
6. Peer review	117
7. Teamworking and promoting teamwork	116
8. Innovation in teaching and learning	116
9. Conflict of interest management	115
10. Copyright	114
11. Plagiarism	114
12. Scientific writing	113
13. Critical thinking	101
14. Poster presentation	100
15. Team-based leadership	99
16. Team conflict management	98
17. How to prepare a poster for international sessions	98
18. Creative thinking	97
19. Departmental motivation (how to motivate academic department members)	97
20. Role modeling and how to inspire it	97
21. Academic management	96
22. Academic performance	96
23. Exclusive use of english language	96
24. Positive competitive environment	96
25. Academic leadership	95
26. Interdisciplinary academic work	95
27. Interactive homework	94
28. Learning how to do an international collaboration	92
29. Departmental development	91
30. Pedagogic and adult learning	90
31. Analysis and comparison	89
32. Clinical duties	88

teamwork and learning how to do it (items 29 & 32 in table 1)

- How to publish academically; including conflict of interest management, copyright, peer review, plagiarism, and scientific writing (6,7,22,24 & 28 in table 2).

The above results demonstrate the main areas of interest in FDP for junior faculty members who were

interested in improving their scholarship activities. Though other issues were not rated as high as the latter ones, they covered important topics.

"Attitude" is a definite and important concept in many fields including medical education and is a complex mental state including beliefs and behaviors that affect the human's profession and eventually their performance (26,27). Merriam-Webster's definition of "attitude" is "a mental position concerning (or a feeling or an emotion toward) a fact or state" (28). Attitude leads to dynamic influences on one's responses to all the received signals from peripheral stimuli; "dispositional attitudes predict general action and many behaviors" (4-6,28). In other words, attitude is defined as an "enduring, learned predisposition to behave consistently toward a given class of objects, or a persistent mental and/or neural state of readiness to react to a certain class of objects, not as they are but as they are conceived to be" (4-6,28). Besides, studies have pointed out that the development of attitudes can be facilitated by providing conducive atmospheres and supporting models. This seems to be the reason why the FDPs and "teaching the teacher courses" will affect the personal and professional behavior of the faculties (3,29); this was exactly the dominant aspect of the current FDP.

The present study tried to perceive the attitudes of junior faculty members, DACC, SBMU towards the effects of an FDP on their scholar activities; while the results demonstrated that they had overall positive attitudes towards the FDP courses. This finding suggests that the mental perception of the junior faculty members, DACC, SBMU has been positively affected and possibly, positively changed.

FDPs not only improved the personal capacities of the faculty but also affected the organizational aspects of faculty function including new faculty members' professional orientation, improved leadership capacities, and organizational development (3,7,18). FDP is a formative process in many aspects and includes improved skills as well as strengthening professionalism. Many studies have been dealing with ethical and professional aspects of clinical faculty development; which demonstrate the dual role of these faculty members both as trainers/educators and clinicians. Medical education mandates fulfilling clinical tasks intermingled with professional clinical service delivery; these are in concordance with our findings (30,31). On the other hand, the ongoing achievements in medical sciences mandate improvements in medical education; considering issues like competency-based medical education, teaching and learning specialized skills, *etc*. which should be dealt with as basic items when designing faculty development courses (9,32).

Besides, the results of this FDP could have been highly correlated with the results of an integrated educational package involving the following aspects which have used a combination of teamwork, novel educational approaches, and professionalism-based methods in DACC, SBMU, leading to improved educational outcomes (10,33-38):

- Mentorship-based residency approach
- Mocked Objective Structured Clinical Examination (OSCE) exams
- Monthly In-Training Examination (ITE)
- Tele-education sessions
- The small group blended learning
- Role-playing and simulated patient scenarios.

Though in this study we did not directly assess the effects of FDP on the above six items, the time synchronization of the latter studies (10,16,31,33-41) with the current one and the common role of the faculty members in these studies suggest the potential role of FDP in the improvements in DACC, SBMU.

One of the other main aspects that have been considered important for junior faculty members has been dealing with academic publishing and scientific writing; including the issues related to conflict of interest management, copyright, peer review, plagiarism, and scientific writing. These items demonstrated that junior faculty members have been eager to learn more about the issues that have led to scholarship improvements. Interestingly, nearly all the faculty members who had taken part in the FDP have experienced a step forward in their academic achievements; suggesting the role of FDP in accelerating the junior faculty members' academic achievements. Finally, though the other aspects and other titles of the program have been potentially important contents, the relatively lower rates for them suggest that comprehensive needs assessments are mandatory before starting future FDP courses for junior faculty members.

A fruitful FDP is built on different domains of core competencies of a faculty; including but not limited to the following (30,32,42-45).

Professional and behavioral development is an inseparable part of the teachers' attitude. To achieve this milestone, a faculty should have an orientation model for their role as a faculty at the beginning of their career.

Academic and intellectual development: all the faculties should improve their skills of scholarly activities to expand and advance the medical knowledge.

Educational development: All the new faculties should have been instructed to engage sufficiently in teaching and leadership activities. Having a mentor, and attending teaching and coaching workshops are some examples of expanding this role.

System-based structural development: all the faculties should be instructed on all the organization roles, regulations, and policies to understand the system resources and when to use them and eventually contribute to their departmental/ university goals and achievements; which have been the cornerstone of the current FDP.

Finally, perhaps the most logical explanation for the findings in this study remains beyond the above paragraphs. Though the last word about the role of socio-material theories in medical education has to be uttered, FDP and its teamwork are possibly the main backstage of all the latter achievements (46). Based on the Actor-Network-Theory (ANT), the role of teamwork is not just defined as a group of people working together; instead, socio-material approaches enable us to explore novel windows in academic achievements; such approaches like ANT theory not only innovate the organization in medicine but also, deeply innovate the outcome (47,48). The current model of FDP could be a practical application of the "assemblages" concept into practice, a practical approach for developing countries that at times suffer from deficient logistics; coping with all material defects (49). Furthermore, there is revolutionary paradigm of "Cultural-Historical Activity Theory-CHAT" with a special focus on the challenge between clinic and education in medical schools (50,51); the junior faculty members with a considerable workload had an overwhelming enthusiasm in the FDP course, possibly due to the effects of CHAT in changing not only the attitude but also the insights of individuals leading to a "meaningful transformation of an organizational activity" (52).

Limitations: there are some limitations to this study: in this FDP, only those faculty members aged less than 40 years old were included to create more effective in their academic path; however, about 60 percent of those who were in this age range participated in the FDP course; mainly due to a shortage of funding for holding extra FDP courses. This is a potential weakness which should be managed in future programs of DACC, SBMU.

Another limitation could be related to the open questions, where there is the possibility that we had demonstrated signs of bias causing validity and reliability issues on the questions the participants were asked, especially question 4. This was in part due to the semi-structured format of the open questionnaire. This is an evaluation project by nature; so the results lack sufficient generalizability. The course design and the evaluation were performed by the same person which may have limitations. Some bias in the findings could be anticipated.

Conclusion

The attitudes of junior faculty members three years after a 6-month departmental FDP in DACC, SBMU, Tehran, Iran towards the course were both positive and conducive, suggesting the potential path for similar experiences in an academic environment of a developing country. Besides, in similar academic atmospheres, the FDP approach could be translated as a long-life academic investment. However, a "needs assessment" of the attitudes of the participants could improve the effectiveness of these courses. Besides, the impact of the FDP demonstrated significant objective academic improvements.

Ethical approval and consent to participate

Institutional Review Board (IRB), research ethics committee, Deputy of Research, SBMU; coded IR.SBMU.RETECH.REC.1399.463. Besides, written informed consent was waived by the IRB.

Consent to participate

All the authors have informed written consent to

participate. No other consent seems applicable. Besides, written informed consent was waived by the IRB.

Availability of data and material

Ali Dabbagh holds all the data available; besides, the majority of the data are referenced in previous studies cited throughout the text.

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Conflict of Interest

None of the authors has any conflict of interest.

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