

## Mentoring in Medicine: A Retrospective Study

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### Abstract

The aim of this research is to carry out an evidence-based retrospective study reviewing data acquired from previous research articles published between 2011 and 2016; in order to access the impact of mentorship in medicine through data extraction, presentation and meta-analysis. Also, we intend to identify the common models and types of mentoring reported to be used in medicine (academic, research and clinical medicine) between 2011 and 2016.

We reviewed PubMed Central (PMC), Biomed Central (BMC) journals, Association of American Medical Colleges (AAMC), MEDLINE and CLINICALKEY for articles published between 2011 and 2016 pertaining to mentoring in medicine. Searches were conducted with the use of the following key phrases such as “mentoring in medicine”, “effect of mentorship on future physicians”, “systematic review of mentoring in medicine” “mentoring surveys in medicine”. The data obtained was then analyzed and presented in tables followed by a detailed and concise interpretation. From the data analyzed we were able to identify the common mentoring models and types commonly used in medicine between 2011 and 2016. The common mentoring models identified in this research include: one-one (Dyad), peer facilitated, multiple mentors and electronic (Distance) model. Moreover, the common types of mentoring identified include: Formal and Informal. The formal type requires documentation, planning, legal agreement between the mentor and mentee, a curriculum and inclusively program funding.

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Although, the most common model identified among women was the peer model. Additionally, mentees and mentors both valued the idea of time allocation. Mentoring in medicine was found useful in areas of career satisfaction and career planning, personal growth and professional development, development of self-confidence and good communication skills. Mentoring was also found to play an important role in academic medicine and research. We were able to clarify the impact of mentoring on career planning and development, personal growth and professional development, self-confidence and good communication skills and its role in academic medicine and research to be positive. In overall, mentorship has proved to be a necessity in all aspects of medicine within the past few years.

**Keywords:** Mentoring model; Mentoring type; Mentorship; Mentor and mentee; All Saints University School of Medicine; Dominica.

## **1. Introduction**

Mentorship is a vital component for development in both academic and clinical medicine. The term mentor in medicine describes an experienced and knowledgeable individual who has the ability to advise his or her follower the mentee in the right path in order to attain academic, professional and research excellence; including career satisfaction in the field of medicine. One of the main goals of mentoring is to help the mentee develop an interest in a particular specialty and amply develop the personal qualities of the mentee. With effective mentoring, a mentee should be able to gain good amount knowledge in order to choose a decent choice of professional trajectory [1, 2]. For a good mentee-mentor relationship to exist there must be no personality conflict for an equitable agreement to be established. This process will aid easy communication between the mentee and the mentor [3, 4, 5]. Recently, mentoring is becoming a necessity for minority medical students who are in schools that do not have a mentoring program in order to achieve maximum career success [6]. Mentors also derive benefit from mentoring; benefits such as satisfaction from helping others, reward, and improvement in professional skills through exposure to new expertise and ideas [7]. Mentorship requires great interest and hard work from both the mentee and mentor. Careful planning of a mentoring scheme with good planning and support, strong relationship and logistics are likely to ensure success [8]. Most people may ask what makes a good and bad mentoring relationship; the answer; successful mentoring relationships require trust, similar values and interest, respect and a strong rapport [3, 8, 9, 10]. On the other hand unsuccessful mentoring relationships is characterized by lack of interest and motivation, lack of skills and valuable knowledge by the mentor, poor contribution from both parties and conflict of intended goals [3, 8]. Apparently; there are limited meta-analytic retrospective studies available that have collectively analyzed the impact of mentoring in medicine within the past few years. By combining mentorship and other helpful means, work-life balance can be attained in clinical research as this will help upcoming clinician researchers experience better job satisfaction [11].

## **2. Materials and methods**

Data collection was done through the following research databases and journals; PubMed, Cochrane, JAMA, Medline, CO-ACTION, Biomed Central, AAMC journal and Google scholar for articles published between 2011 and 2016. Key phrases used during the search were 'Mentorship in medicine', 'Effects of mentoring future

physicians', 'Mentoring models in medicine', 'Types of mentoring in medicine', 'Mentoring and career planning in medicine', 'Mentoring and career satisfaction in medicine', 'Mentoring and role in clinical research', 'Mentoring survey in medicine', 'Impact of mentoring in medicine', 'Mentoring in medical faculty', 'Mentoring in academic medicine' and 'Mentoring models in medicine'. We also used the references of the acquired articles as a source for other useful articles relating to the research topic. We carefully examined the abstract of 60 research articles. Most articles used were survey articles. Each article were reviewed based on the content of their abstracts and a final selection was made base on the content of the full-text article. Out of the 60 articles only 19 research articles were used for the research as they tend to contain more credible evidence for the research. There were 8 articles that contained data on the models and types of mentoring while 11 were used to access the impact of mentoring on medicine within the past few years with consideration of certain variables such as career planning and choice, its role in academic medicine and research, personal growth and professional development, self-confidence and communication skills. Conclusions were based on the responses from previous mentees and mentors who participated in mentorship in areas of academic, research and clinical medicine. According to these articles, the subjects of the research were mainly medical students, residents, academic physicians, clinician researchers and hospital clinicians, irrespective of gender. We used research questions for data collection and extraction. Each source was paired with data obtained, in a table and we were able to analyze the results and come to a conclusion. The analysis was made on a retrospective basis in order to determine the overall impact of mentorship in medicine. Data collected for research were obtained from articles dated between 2011 and 2016. Each research article was screened carefully before data collection. Research questions were used to aid data extraction from the data reports of previous research articles.

*Accessing the main models and types inclusively the most preferred type of mentoring used within the past few years:*

1. What are the common mentoring types used within the past few years?
2. What are the common mentoring models used within the past few years?

### **3. Results**

From all 8 research articles [5, 8, 12, 13, 14, 15, 16, 17] we were able to extract credible data on the most commonly used models and types of mentoring in medicine (academic, research and professional settings). We diversified the sample population by getting articles originating from various countries in order to avoid selection bias.

*Data Report: Main mentoring models and types identified within the past few years*

The concept of mentoring models and types tend to be more applicable to academic medicine and research. Over the past few years various models and types of mentoring have been established but only a few truly stand out. Starting with the most identified models which include one-one, multiple mentors, peer facilitated model and electronic model (Table.1). While others identified in the course of this research include functional, group

and speed models. Firstly, the one-on-one model of mentoring also described as the Dyad model in some research articles is mainly between a single mentee and the mentor [1, 9, 18]. The mentor here is often a senior professor, clinician or faculty member and far more experienced than the mentee [2]. It is a more individualized model and the focus of the mentor is placed on only one mentee [18].

**Table1:** Data report for the models and types of mentoring used within the past few years in Medicine.

Source	Mentoring models identified	Mentoring types identified
Park and his colleagues [12] 2016 CANADA	-	Formal and informal
Varkey and his colleagues [13] 2012 USA	Peer facilitated model	Formal
Decastro and his colleagues [14] 2014 USA	Multiple mentors Electronic model	Informal (No mention of formally planned mentoring)
Fornari and his colleagues [5] 2014 USA	One-one Multiple mentee	Formal and Informal; others were formal advising programs, random or combined mentoring and advising program
Dimitriadia and his colleagues [15] 2012 Germany	One-one Electronic	Formal (No mention of Informal type)
Iversen and his colleagues [8] 2014 UK	One-one	-
Sambuco and his colleagues [17] 2013 USA	Peer	Formal
Sinclair and his colleagues [16] 2014 UK	One-one Electronic Peer facilitated	Informal (article stated that mentoring was undocumented). No mention of formal mentoring

Many view this model to be one of the most effective models as it is deemed to establish a strong relationship between mentees and the mentors; giving the mentors a better understanding of the challenges faced by young academics [8]. However, due to lack of diversification of mentorship there is the limited point of view and ideas available to the mentee when compared to other models of mentoring involving group participation such as the team model, multiple mentor model and peer model. There are evidence that one-one mentoring provides students with suitable mentors [15]. This model was identified in 5 articles [5, 8, 9, 15, 16]. Secondly, the

multiple mentors' models found in one of the article reviewed [14] tend to involve a single mentee and multiple mentors. This model of mentoring is seen mainly in clinical research [2, 14, 18]. The mentee has to reach out to each mentor individually. Each mentor has an individual duty to the mentee. These groups of mentors may be from diverse faculties but tend to work towards the same goal together with the mentee as a team. The issue of conflict of ideas is easily resolved with fewer propensities for problems [18]. Also, the mentee is open to a myriad of mentors with a great amount of knowledge to gain. This will help impact the quality of problem solving in the mentee due to the team based approach used in this model. The individual benefit of the mentors involved is that each mentor will be able to gain more ideas by sharing personal views and knowledge. This model tends to be more effective in a basic clinical research setting [14, 18]. Thirdly, the peer facilitated model tends to be less formal and only involves peer-peer guidance with a facilitator who regulates discussion between its members. Participants tend to be at the same level of training [18,19]. Apparently, from the perspective of the authors of this research, peer mentoring tend to be effective but not sufficient enough to attain a successful career as a physician but no substantial evidence has been presented to support this statement yet. According to the Division of Preventive and Occupational Medicine and Department of Medicine, Mayo Clinic, Rochester, MN, USA women; Peer-mentoring has been reported as a successful alternative to the dyadic mentoring model for women interested in improving their academic productivity [13]. Peer-mentoring enhances the ability for students to expand their social network with more experienced peers and clinicians who are willing to share a vast amount of knowledge and ideas[13].A total of 4 articles presented data on this model [9, 13, 16, 17 ].The fourth and final model is the Electronic mentoring model also known as the Distance model. It involves the use of web services such as mailing systems, Skype calls, telephone calls and other online services not mentioned in this context, for mentoring [2]. This is often used when mentor has limited contact with the mentee. Data report on this model was obtained from 4 articles [9, 14, 15, 16]. However, in a recent research done on 14 new medical schools in the United States established from 2006 or later, the multiple mentees' model was used in most schools where each mentor was paired with more than one mentee but few schools did maintain a one-one model [5].

Moreover, the common types of mentoring mainly used within the past few years include the formal and informal types of mentoring; according to data presented on Table.1. Firstly, the formal type of mentoring is used mainly in academic institutions to promote academic progress and excellence of the mentee. It is formally planned, scheduled and funded by the institution [9]. Here, choice of a mentor is not entirely up to the mentee as each student may be allocated a faculty mentor. But in some occasions the mentee is allowed to choose his or her mentor [5]. It totally depends on the structure and design of the mentoring program of the medical institution. Here, a schedule is used in the process of mentoring and records are made [5, 9, 13, 15, 17]. Data has shown that medical students with good grades are more likely to participate in formal mentoring program [15]. One common barrier to this type of mentoring is the problem of funding and time allocation [9]. We identified formal mentoring in 5 articles [5, 12, 13, 15, 17] Secondly, the informal type of mentorship does not require any formality nor does it require documentation of the details of the process. Informal mentoring was identified in 5 articles [5, 12, 14, 16]. A strong rapport is established between both parties but most times the mentee makes his or her choice of a mentor. Meanwhile, most of the new medical schools in the United States which stated in 2006 or later had applied for preliminary accreditation from the LCME by August 2011 reported using a formal

type of mentoring [5].

**(2.) Assessing the impact of mentoring in medicine within the past few years**

We used the following research questions to extract data from the data report on **Table.2**

1. Formal and Informal mentoring, which has a greater Influence on career choice and planning? Does mentoring really play any role in the career planning and satisfaction of the mentee?
2. Is career planning among the most discussed topics in mentorship?
3. Does mentorship play any role in academic medicine and research?
4. Does mentoring help the mentee to develop Good Networking skills and Self-confidence?
5. Does mentoring contribute to the personal growth and professional development of the mentee?

**Table 2:** Data report of research articles comparing their conclusion in regards to mentoring in medicine.

Author and Year	Conclusion
Yehia and his colleagues [20] 2014 USA	Data show that the lack of diverse faculty mentors may impede diverse residents' satisfaction.
Park and his colleagues [12] 2016 CANADA	Informal mentorship was common for medical students. The presence of an informal mentor was not associated with dissatisfaction with the Faculty advisor or with the mentorship program. It is likely students may pursue informal mentorship for career-related reasons.
Iversen and his colleagues [8] 2014 UK	Careful planning of a scheme including preparation, training and ongoing support of both mentor and mentee addressing expectations, building rapport and logistics are likely to be helpful in ensuring success and benefit from the intervention.
Varkey and his colleagues [13] 2012 USA	The program yielded a positive impact on academic skills and manuscript writing for junior women faculty.
Sharon and his colleagues [3] 2012 CANADA	Successful mentorship is vital to career success and satisfaction for both mentors and mentees.
Decastro and his colleagues [14] 2014 USA	This study of junior faculty holding mentored career development awards showed strong associations between several aspects of mentoring and career satisfaction.
Pfund and his colleagues [21] 2014 USA	This randomized controlled Trial demonstrates that a competency-based research mentor training program can improve mentors' skills.
Smbuco and his colleagues [17] 2013 USA	Mentoring networks, rather than mentoring dyads, are critically important in career development. Therefore, that this model should be applied more generally within academic medicine Those who seek to promote the careers of faculty in academic medicine should focus on developing mentoring networks rather than on hierarchical mentoring dyads.

Dehon and his colleagues [22] 2015 USA	These results suggest that simply having a mentor during Medical school does not impact match outcome but rather having an effective mentor.
Fornari and his colleagues [5] 2014 USA	There was little uniformity among mentoring programs at new medical schools, likely reflecting differences in curriculum and program goals.
Dimitriadia and his colleagues [15] 2012 Germany	There is a large-scale feasibility of one-one mentoring providing students with suitable mentors. There is some evidence that student with strong academic performance are significantly more likely to choose a personal mentor. Medical students with strong academic performance as defined by their grades are more likely to participate in formal mentoring programs. Mentoring relationships between faculty and medical students are perceived as a mutually satisfying and effective instrument for key issues in medical students' professional development.

All 11 articles [3, 5, 8, 12, 13, 14, 15, 17, 20, 21, 22] reported on the various ways mentorship has influenced and impacted medicine within the past few years. The subjects were medical students, academic physicians, clinician-researchers and hospital clinicians.

#### 4. Discussion

##### **Formal and Informal mentoring, which has a greater Influence on career choice and planning? Does mentoring really play any role in career planning and satisfaction?**

Questionnaire survey administered to the graduating class of 2014 at Calgary's Cumming School of medicine showed that the students (the mentees) were influenced by their informal mentors to influence them more positively than their faculty mentors [12]. In this study, the career choice of the students was primarily associated with the area of specialization of the informal mentor and most mentees clearly stated that their informal mentors took active part in the process of career selection and strategic achievement of their goals as compared to their faculty mentors [12]. Apparently, having an informal mentor never led to dissatisfaction with the faculty advisor or mentorship program [12]. Most students choose Informal mentorship mainly for career purposes [12]. In addition, career counseling was discussed more informally in comparison to the formal discussion; in a research survey obtained from administrators of 14 new medical schools obtained from the Liaison Committee on Medical Education, established since 2006. The surveys were in regard the structure and implementation of their mentoring programs. In general career planning was discussed more mutually (formally and informally). Assistance with specialty selection was more informal but in overall more mutual. Mentoring programs proved valuable at each institution but one major challenge was time allocation and lack of financial incentives. Little uniformity existed among mentoring programs in new medical schools. Differences included curriculum and program goals [5]. A third research was done at the University of Munich Medical School which included medical students physicians and scientists as the subject of the research. The mentees were the medical

students but the mentors were mainly physicians and scientists. Data report showed that one of the commonly discussed topics in mentorship is career planning. Mentees also emphasized the positive impact of mentoring relationship on career planning and research. Informal mentors tend to demonstrated good communication skills general interest in students and work-life balance than their formal counterparts [5, 12]. An effective mentorship is crucial for career satisfaction in medicine [3, 8]. Career planning is one of the most discussed topics in mentoring [5, 12, 15]. Research by Decastro and his colleagues [14] showed that strong associations existed between junior faculty with career development award and many aspects of mentoring.

### **Mentorship role in Academic medicine and Research**

According to the academic medicine Partners Portal, academic medicine consists of three main areas- hospital care, education and research. These are very vital aspects of medicine. The question now is, does mentorship play any role in academic medicine? If yes, in what way? Data from Yehia and his colleagues [20] showed that 93% of the respondents (U.S residents) reported that mentorship was important for entering academia while 70% reported having sufficient mentorship before starting their academic careers [20]. Mentoring networks were found to be more important in career development and those who had interest in promoting the careers of faculty in medicine were encouraged to focus on developing mentoring networks rather than a one-one or Dyad model [17]. Considering the role of mentoring in research, female participants generally accept the idea of having at least one female mentor. Some even supported the need to evolve their portfolio of mentors [17]. Positive impact of mentoring relationship on research was also emphasized with a supporting evidence of 75% in a research carried out at the University of Munich Medical School. Mentoring also helped medical students to support their interest in research and academic careers [5, 15]. Note also that some mentors require training to improve their skills in mentoring [21]. Mentees working with mentors who undergone training reported changes in mentor's behavior than those in the control group [12]. Very few clinician-researchers tend to be dissatisfied with mentoring [14]. Mentoring has also shown to enhance research contribution and improvement in ability to effectively review, evaluate and write a research article [8, 13, 15]. Data report from Decastro and his colleagues [14] showed that only 10% of clinician-researchers irrespective of gender were dissatisfied with mentoring. Additionally, some mentees agree that their mentors did promote their interest to stay in academic medicine.

### **Does mentoring Improve Academic performance of students?**

In a research conducted by Fornari and his colleagues [5] 8 out of the 14 schools that took part, reported that the chance to keep abreast of recent issues in academic medicine as one of the main subject of discussion. One respondent stated mentoring "keeps you on your toes according to the article". Efficient and high performance students notably more likely to participate in a mentoring program with a p value of <0.001 [15]. On a conclusive note, there is some evidence that students with brilliant academic performance are more likely to have personal mentors [15]. However, having a mentor in medical school does not assure success in the near future but rather having a mentor who is adept and proficient [22]. Peer mentoring program positively impacts the academic skills, improvement in research skills and satisfaction in academic achievement of women faculty [13]. Research done by Dehon and his colleagues [22] on 297 emergency medicine residents in the United States suggest that having a mentor during medical school does not create any match outcome during residency



but rather having an effective mentor [22].

### **Does mentoring help the mentee to develop good communication skills and self-confidence?**

In order to develop a good networking skill an individual has to be a good listener. Effects of mentoring on the networking skills and self-confidence of the mentee was reported in article [8]. Here, data report showed that 59% of the mentees accepted the fact that mentoring helped them develop better self-confidence; while 60% attested that it helped them develop greater independence. According Park and his colleagues [12] mentors were able to demonstrate good communication skills during mentorship process. More report of positive impact on networking skills was received from mentees with little negative impact. This topic was also among the commonly discussed topics during the process of mentoring as shown in article [12].

### **Does mentoring contribute to the personal growth and professional growth?**

We were unable to obtain enough evidence for this issue. Nevertheless, data report from article [22] also proved that mentoring helped to motivate emergency medicine residents as former mentees in took part in mentorship when they were in medical school. In addition, they reported that their mentors suggested appropriate resources and provided guidance on professional issues for them.

## **5. Conclusion**

Mentoring is definitely an important and extremely vital component for career development, improvement of research skills, development of self-confidence, a staple for entry into academic medicine and an essential tool for the production of better physicians in both academic and clinical medicine. This research have shown that mentorship is not only an important tool for career development but also necessary for the development of good communication skills, personal growth and professional development. Although, Informal mentoring have shown to have more influence on career choice. In general, mentoring has played a vital role in the choice of career and career satisfaction within the past few years. In academic medicine it is viewed as an extremely important tool for entry into academic medicine. The common models and types of mentoring used in medicine within the past few years include; One-one (Dyad), multiple mentors, peer facilitated and Electronic (Distance) model. Furthermore, the common types of mentoring reported on are the formal and informal types of mentoring as shown in the context of this research. Although, formal type of mentoring was reported to be used in most new medical schools established in 2006 or later.

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