

# Mentee-mentor Satisfaction among Junior Doctors and Senior Medical Staff at Two Australian hospitals: A Longitudinal Study of a Mentoring Program.

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## Research Article

**Keywords:** Longitudinal, Medicine, Mentoring, Mentor, Mentee, Quantitative

**Posted Date:** March 14th, 2022

**DOI:** <https://doi.org/10.21203/rs.3.rs-1421137/v1>

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# Abstract

## Background

Mentoring is a unique educational workplace relationship that can support the skill, knowledge, social and emotional needs of both the mentee and mentor. This study aimed to assess the level of participant satisfaction in achieving these aims for a mentoring program implemented at two hospitals in New South Wales, Australia.

## Methods

Using a quantitative approach, survey data were collected from 22 junior doctors (the mentees) and 21 senior medical staff (the mentors) at pre-, mid-and post-program. Between group differences were assessed using the Mann-Whitney U test and Fishers' exact test, while temporal trend was assessed using the Cochran-Armitage trend test.

## Results

Though no temporal trends or mentee-mentor differences reached statistical significance, junior doctors were found to initiate mentee-mentor meetings more frequently, at both mid-program (50% vs 30%) and post-program (50% vs 19). In addition mentees displayed higher levels of program satisfaction when compared to their mentors at mid-program (100% vs 85%) and post-gram (94% vs 75%).

## Conclusions

Mentoring, if implemented correctly and well-timed, undoubtedly has the necessary properties to enhance each participating party's professional and personal lives, be they doctors or not.

## Background

Mentoring has been used in many professions and academic disciplines to support and build relationships [1–5]. Whilst professional societies have formal mentoring programs, especially in business, to date, the medical sector has generally encouraged mentor relationships of an informal nature.

Mentoring has been identified as a valuable tool for junior doctors' personal and professional development [6]. Mentoring is considered distinct from all formal assessment processes within this setting, including educational and clinical supervision, although some individuals may play both supervisor and mentor roles. For example, the Royal College of Physicians Core Medical Training curriculum in the United Kingdom currently includes the objective of 'being willing to accept mentoring as a positive contribution to promote personal professional development' [7]. It is vitally important to differentiate the role of a mentor from that of an advisor, supervisor, or another supportive senior colleague. However, mentoring often occurs in advising or supervisory relationships, and there usually is

a continuum regarding the extent to which such relationships represent mentoring. Compared to other supportive working relationships, the mentoring relationship is characterised by more shared intent and higher levels of involvement by both parties [8, 9]. It is more transformational than transactional.

Though medical schools are increasingly incorporating mentorship into their programs [10, 11], there remains a paucity of publications describing or evaluating mentor-ship programs in medical education research concerning the degree of program satisfaction [12, 13]. Over the past 30 years, research into the beneficial effects of mentoring has predominately been confined to the business sector [14, 15]. Fortunately, and as Hansford et al. [16] reported in a systematic review, such benefits appear to be very generalisable to other fields such as education and medicine. Furthermore, these benefits are not seen to be one-dimensional. The research literature clarifies that benefits emanating from mentoring programs extend beyond the mentee [17, 18].

Firstly, there also are countless benefits to serving as a mentor. Mentors typically are more productive, have greater career satisfaction, and report more personal gratification [19, 20]. They also have enhanced competence, greater access to new ideas, and experience more personal growth [21]. Further, in some settings, they gain increased recognition from their peers [19]. Secondly, mentoring can benefit the institution in which it occurs [19]. This occurs through greater job satisfaction, more capable staff, higher levels of motivation and productivity, and the creation of lifelong learning norms. Thirdly, are the benefits that mentoring programs bestow on mentees. Such programs allow junior doctors to develop competencies, improve their performance, and have greater professional and personal satisfaction in a medical setting. Those who receive quality mentoring have been shown to accrue more objective benefits later in their career paths, such as better compensation, more publications and grants, a greater likelihood of being promoted, more recognition, and enhanced career mobility and opportunity. In addition, in terms of their subjective experience, they are more likely to report greater role socialisation, have more satisfaction with and commitment to their careers, express more positive beliefs and confidence about their capacity to advance professionally, feel more prepared to be leaders, and believe that the mentoring experience supported their personal development [22–25].

Mentoring programs are increasingly being implemented based on this theoretical background, but the extent to which a mentoring program can support specific learning needs, especially in the medical sector, has rarely been explored using a longitudinal framework. This study addresses this situation by analysing the degree of participant (program mentees and mentors) satisfaction with a hospital mentoring program for junior doctors in the Central Coast Local Health District (CCLHD) of New South Wales, Australia.

## **Methods**

### **Participants**

Participants in the voluntary mentoring program were recruited from 61 junior doctors in training and 50 senior medical staff practising at two hospitals within CCLHD: 1) the 484-bed Gosford District Hospital (GDH); and 2) the 300-bed Wyong Public Hospital (WPH). Located between Sydney and the Hunter Valley, the CCLHD provides health services to over 330,000 people in the Gosford City and Wyong Shire local government areas [26].

## Mentoring Program

Training and information regarding the mentoring program were delivered over several sessions. Commencing in late 2018 and concluding in early 2019, mentors predominately attended these meetings. The first of these sessions was the *Introductory Mentor Training* session. Potential mentors at GDH and WPH were provided with information and resources relating to mentoring in general and the mentoring program specifically. There were 25 attendees at the GDH session, which was held in November 2018 and 10 attendees at the WPH session, which was held in December 2018. Subsequently, a *Mentor/Mentee Meet and Greet* session was held in January 2019. This was an informal session with the aim of mentors and mentees establishing a mentor-mentee relationship outside the confines and restrictions of work and training. It was held two months before the first of three surveys. In June 2019, and one month before the second survey was released, another session with mentors only was conducted. Titled *Developing Mentor Skills*, it provided a forum for mentor feedback and fostered the development of mentoring skills through role-plays in several differing scenarios. This session had 15 attendees. Finally, a *Mentoring Program Wrap-up* session was held in December 2019, two months before the third and last survey. Attendees included both mentees and mentors and numbered 35. The type of mentee-mentor meeting was optional, with all meeting forms allowable, be they face-to-face, email, telephone, or other conditions.

## Data collection

Participants were surveyed three times. Each of these surveys was by way of an anonymous, voluntary, electronic survey via email to all potential participants. The email contained a link to an electronic survey engine, *Survey Monkey* (Survey Monkey, Palo Alto, California), where participants could complete the survey and provide feedback. All participants were asked to give the last four digits of their mobile phone number as an identifier for the longitudinal analysis.

The first survey, the pre-program survey, was released on the 11th of March 2019. The second survey, the mid-program survey, was released on the 18th of July 2019, and the third and final survey, the post-program survey, was released on the 15th of February 2020. Each survey remained available for four weeks.

Across the three surveys, the number of items ranged from seven to 18 items for mentees, whilst for mentors, it ranged from nine to 17. Items were predominately measured on a binary scale (yes /no responses), with the exceptions being age measured on a continuous scale and discussion topics measured on a nominal scale. In addition to the socio-demographic characteristics of participants, the surveys also sought to collect information in order to: 1) assess the value and benefits of the program

(and possible improvements to it); 2) facilitate self-assessment; and 3) explore the program's influence on career satisfaction at CCLHD.

## **Ethical considerations**

This study was approved by the CCLHD Operational Research Committee as being of 'Negligible ethical risk', as it only involved the use of non-identifiable data, applied no more risk to any patient than of inconvenience. It did not present any other potential ethical risks to those involved. Participation was based on informed consent.

## **Statistical analysis**

Descriptive statistics were examined and reported for continuous data as medians and interquartile ranges (IQR) due to non-normality. Categorical data were reported as counts and percentages. Between-group comparisons of continuous variables were performed using the Mann-Whitney U-test, while categorical variables were compared using Fisher's exact test. To investigate the presence of a temporal trend in survey response, the Cochran-Armitage trend test for proportions was applied [27]. A Bonferroni adjustment was performed to correct for multiple testing. All reported p-values were based on two-sided tests and compared to a significance level of 0.05. A complete-case analysis was performed, and missing data were not imputed. Analyses were performed with Stata Version 17.0 (StataCorp, College Station, Texas).

## **Results**

### **Participant characteristics**

Participant characteristics at pre-program are reported in Table 1. Mentors were found to be significantly older than mentees ( $p < 0.01$ ), with median ages being 53 years (IQR: 47–59) and 27 years (24.5–29), respectively. A significant gender difference ( $p = 0.03$ ) was observed, with mentees more likely to be female (63%), while mentors were more likely to be male (80%). No significant differences between the groups regarding prior experience with a mentoring program or relationship were detected.

Table 1  
Mentee (N = 22) and mentor (N = 21) characteristics, pre-program

Characteristic	Mentees	Mentors	P-value
	n (%) <sup>a</sup>	n (%) <sup>a</sup>	
<b>Children</b>			< 0.01 <sup>b</sup>
No	15 (100)	0 (0)	
Yes	0 (0)	16 (100)	
<b>Gender</b>			0.03 <sup>b</sup>
Female	10 (63)	3 (20)	
Male	6 (38)	12 (80)	
<b>Prior experience with a mentoring program</b>			0.07 <sup>b</sup>
No	17 (90)	13 (62)	
Yes	2 (11)	8 (38)	
<b>Relationships</b>			0.65 <sup>b</sup>
Not in a relationship	4 (25)	2 (13)	
In a relationship	12 (75)	14 (88)	
<b>Age (years), Median (IQR)</b>	27 (25–29)	53 (47–59)	< 0.01 <sup>c</sup>
Abbreviations. IQR = Interquartile range.			
Notes. <sup>a</sup> Due to missingness, percentages are calculated using a complete case approach, <sup>b</sup> Fisher's exact test; <sup>c</sup> Mann-Whitney U test.			

## Participation rates

Of the 22 mentees and 21 mentors enrolled in the program, no significant difference ( $p = 0.71$ ) in participation rates between the two groups ( $p = 0.71$ ) was detected, with 14 (64%) mentees and 16 (67%) mentors completing all three surveys (see Table 2). Non-response was more likely on the post-program survey, with six mentees (27%) and five mentors (24%) failing to respond, instead of less than 10% for the pre-and mid-program surveys.

Table 2  
Participation rates for mentees (N = 22) and mentors (N = 21)

Surveys completed <sup>a</sup>	Mentees n (%) <sup>b</sup>	Mentors n (%) <sup>b</sup>	P-value <sup>c</sup>
1 out of 3	3 (14)	1 (5)	0.71
2 out of 3	5 (23)	4 (19)	
3 out of 3	14 (64)	16 (67)	

Notes. <sup>a</sup> Surveys conducted pre-, mid- and post-mentoring program, <sup>b</sup> Due to missingness, percentages are calculated using a complete case approach, <sup>c</sup> Fisher's exact test

## Mentee-mentor primary and secondary interactions

In their post-program surveys, program participants were asked, “*What was the primary method used for interaction?*” and “*What was the secondary method used for interaction?*” Recollections from both groups were very similar (see Table 3), with no evidence of a significant difference in the former ( $p = 0.23$ ) or latter ( $p = 0.06$ ). Face-to-face meetings as the primary interaction were substantially more popular (mentees:  $n = 81\%$ ; mentors:  $100\%$ ) than other types of interaction such as email, telephone or others. This was especially the case for mentors who self-reported unanimously face-to-face interactions. Conditional on this type of interaction not being possible, there was no discernible difference between email or telephone ( $81\%$  vs  $75\%$ ) as the secondary option of interaction between participants.

**Table 3.** Type of primary mentee-mentor interaction as self-reported by mentees (N=22) and mentors (N=21)

Type of primary interaction	Mentees n (%) <sup>a</sup>	Mentors n (%) <sup>a</sup>	P-value <sup>b</sup>
<b>Primary interaction</b>			0.23
Face-to-face	13 (81)	16 (100)	
Email	2 (13)	0 (0)	
Telephone	1 (6)	0 (0)	
Other	0 (0)	0 (0)	
<b>Secondary interaction</b>			0.06
Face-to-face	3 (19)	0 (0)	
Email	6 (38)	7 (44)	
Telephone	7 (44)	5 (31)	
Other	0 (0)	4 (25)	

Notes. <sup>a</sup> Due to missingness, percentages are calculated using a complete case approach, <sup>b</sup> Fisher's exact test

In their mid-and post-program surveys, participants were also asked in their mid-and post-program surveys, *"Who predominately made contact to arrange meetings?"* While not statistically significant as reported by both surveys, Table 4 shows mentees were slightly more likely than mentors to initiate interactions, though less so at post-program.

Table 4  
Initiator of mentee-mentor meetings as recalled by mentees (N = 22) and mentors (N = 21)

Initiator of meetings	Mentees	Mentors	P-value <sup>b</sup>
	n (%) <sup>a</sup>	n (%) <sup>a</sup>	
<b>Mid-program</b>			0.09
Participant	10 (50%)	6 (30%)	
Equally responsible	8 (40%)	6 (30%)	
The other participant	2 (10%)	8 (40%)	
<b>Post-program</b>			0.22
Participant	8 (50%)	3 (19%)	
Equally responsible	7 (44%)	10 (63%)	
The other participant	1 (6%)	3 (19%)	

Notes. <sup>a</sup> Due to missingness, percentages are calculated using a complete case approach, <sup>b</sup> Fisher's exact test

Participants were also asked on the post-program survey, "How many times did you meet your mentee/mentor throughout the program?"(see Table 5). Of those who responded, most had been involved in at least three meetings (n = 26, 81%), with mentees more likely to participate in at least four (n = 8, 50%) while mentors most likely to participate in three or four meetings (n = 8, 50%). No significant difference was detected between the two groups (p = 0.38).

**Table 5.** Number of mentee-mentor meetings held between mentees (N=22) and mentors (N=21) during program

Number of meetings	Mentees	Mentors	P-value <sup>b</sup>
	n (%) <sup>a</sup>	n (%) <sup>a</sup>	
<b>0 – 2</b>	4 (25%)	2 (13%)	0.38
<b>3 – 4</b>	4 (25%)	8 (50%)	
<b>4+</b>	8 (50%)	6 (38%)	

Notes. <sup>a</sup> Due to missingness, percentages are calculated using a complete case approach, <sup>b</sup> Fisher's exact test

## Satisfaction of program

Two survey questions focused on the degree of satisfaction among participants that the program achieved. Firstly, for all participants and across all surveys, the issue of program satisfaction was

captured by the question: *“Overall, please indicate your satisfaction with the program so far”*. Responses were scored on a binary scale (satisfactory/not satisfactory). As seen in Table 6, the level of mentee satisfaction decreased from a high of 95% (n = 18) on the pre-program survey to a low of 88% (n = 14) on the post-program survey, a test for proportional trend indicated that this reducing trend was non-significant (p = 0.45). Similarly, a test for proportional trend among responding mentors did not produce evidence of a trend (p = 0.67). However and conversely, as seen among mentors, 100% (n = 16) of program satisfaction was reported post-program.

Table 6  
Program satisfaction among mentees (N = 22) and mentors (N = 21)

Survey	Survey			P-value <sup>d</sup>
	Pre-program <sup>a</sup> n (%)	Mid-program <sup>b</sup> n (%)	Post-program <sup>c</sup> n (%)	
<b>Mentees</b>	18 (95%)	18 (90%)	14 (88%)	0.45
<b>Mentors</b>	20 (96%)	17 (95%)	16 (100%)	0.67

Notes. <sup>a</sup>19 mentees and 21 mentors responded; <sup>b</sup> 20 mentees and 20 mentors responded; <sup>c</sup>16 mentees and 16 mentors responded; <sup>d</sup> Royston’s Proportions trend test

The second of these questions, which appeared in the mid-and post-program surveys, asked all participants, *“Has the current mentoring program beneficially influenced your satisfaction in working at CCLHD?”* and *“What influence did the 2016 mentoring program have on your satisfaction with working at CCLHD?”* As seen in Table 7, higher levels of satisfaction were reported by mentees compared to mentors, being 100% (n = 20) vs 85% (n = 17) mid-program, and 94% (n = 15) vs 75% (n = 12) post-program. For both groups, satisfaction levels were seen to decrease over time, decreasing by 6% and 10% for mentees and mentors respectively. However, both trend reductions were found to be non-significant.

**Table 7.** Program influence on satisfaction of mentees (N=22) and mentors (N=21) employed with the Central Coast Local Health District

	Survey		P-value <sup>b</sup>
	Mid-program <sup>a</sup> n (%) <sup>a</sup>	Post-program <sup>b</sup> n (%) <sup>a</sup>	
<b>Mentees</b>	20 (100%)	15 (94%)	0.26
<b>Mentors</b>	17 (85%)	12 (75%)	0.45

Note. <sup>a</sup> Due to missingness, percentages are calculated using a complete case approach, <sup>b</sup> Royston’s Proportions trend test

# Topics discussed during mentee-mentor interactions

Participants were asked in the last two surveys, “What topics do you feel comfortable discussing with your mentee/mentor?” There were 13 topics to which the responder could answer yes or no. As seen in Table 8, the most frequently discussed topics were career development and life/work balance.

Irrespective of group or survey timing, these two topics were discussed at least 85% of the time during mentee-mentor interactions. Conversely, the topic of financial decisions was the least discussed topic, less than 48%. For the trend between the two surveys, only career development, rotations, and life/work balance displayed evidence of an ‘upward trend’ across both groups, though none allowing for a Bonferroni adjustment for multiple testing were found to be statistically significant.

Table 8  
Topics discussed during meetings between mentees (N = 22) and mentors (N = 21)

Topics	Mentees			Mentors		
	Mid-program <sup>a</sup> n (%)	Post-program <sup>b</sup> n (%)	P-value <sup>c</sup>	Mid-program <sup>d</sup> n (%)	Post-program <sup>e</sup> n (%)	P-value <sup>c</sup>
<b>Career development</b>	17 (85%)	16 (100%)	1.00	20 (95%)	16 (100%)	1.00
<b>Career satisfaction</b>	18 (90%)	11 (69%)	1.00	19 (90%)	13 (81%)	1.00
<b>Clinical issues</b>	15 (75%)	10 (63%)	1.00	17 (81%)	11 (69%)	1.00
<b>Communication issues</b>	17 (85%)	12 (75%)	1.00	17 (81%)	13 (81%)	1.00
<b>Critical incidents</b>	10 (50%)	9 (56%)	1.00	16 (76%)	11 (69%)	1.00
<b>Exam preparation</b>	6 (30%)	5 (31%)	1.00	17 (81%)	6 (38%)	0.09
<b>Financial decisions</b>	3 (15%)	1 (6%)	1.00	10 (48%)	7 (44%)	1.00
<b>Family/Personal issues</b>	6 (30%)	4 (25%)	1.00	16 (76%)	8 (50%)	1.00
<b>Life/Work balance</b>	17 (85%)	14 (88%)	1.00	20 (95%)	16 (100%)	1.00
<b>Professionalism</b>	13 (65%)	7 (43%)	1.00	19 (90%)	12 (75%)	1.00
<b>Research</b>	10 (50%)	11 (69%)	1.00	14 (67%)	8 (50%)	1.00
<b>Rotations</b>	13 (65%)	13 (81%)	1.00	17 (81%)	13 (81%)	1.00
<b>Staff interactions</b>	16 (80%)	9 (56%)	0.29	18 (86%)	13 (81%)	1.00

Notes. <sup>a</sup> 20 mentees responded, <sup>b</sup> 16 mentees responded, <sup>c</sup> Royston’s Proportions trend test with Bonferroni correction, <sup>d</sup> 21 mentors responded, <sup>e</sup> 16 mentors responded

## Discussion

Survey responses between the two groups consistently indicated no statistically significant differences concerning participant perceptions and reflections on the mentoring program. Similarly, survey responses taken over time also failed to detect the presence of statistically significant temporal trends, be they increasing or decreasing.

Face-to-face meetings were found to be the most popular type of interaction, similar to findings recently reported by Raghunanda et al. [28]. As a second preference, email and telephone communications were of similar frequencies. Also, these interactions, irrespective of type, were not frequently undertaken during the program's running. The majority of pairings interacted at most four times. This lack of frequency could explain why mentee and mentor perceptions and recollections (e.g. topics discussed during interactions) were not always in total sync. de Janasz & Godshalk,<sup>1</sup> have postulated that a lack of interaction frequency could be one of the retarding factors in assisting mentees to 'mimic' mentor behaviours and maximise benefits.

Both groups reported high levels of satisfaction with the program per se and the degree to which it impacted the satisfaction of training and/or working in the CCLHD. Though satisfaction scores were consistently high for both questions, mentees were slightly elevated on the former and reversed on the latter. These results very much reflect past findings that mentoring is not mutually exclusive, and more is likely to benefit both parties involved in the mentoring process – not just the mentee [29–32].

One recent systematic review examined the prevalence of mentoring in medicine and its effect on career development [24]. They found a significant relationship between the two. Though this relationship was not explicitly quantified in our study, there was sufficient study feedback to indicate that the topic of career development was of extreme importance to our program participants. Along with life/work balance, it was the one topic that was discussed more frequently than any other topic or issue during mentee-mentor interactions.

The main strengths of this study were that it was both longitudinal and quantitative, unlike most studies that have focussed on mentoring programs that have been cross-sectional and/or qualitative [10, 33–35]. As such, it was able to explore and quantify mentee/mentor perceptions and reflections over time. It also had the advantage of being a multi-site study instead of a single site study, thus allowing its findings to be more generalisable than if participants had been sourced from either the GDF or the WPH, but not both. Lastly, but most importantly, mentors were allowed to receive training and resources before the program commenced. A lack of appropriate training can lead to the delivery of inappropriate advice or the imposition of the mentor's views on the mentee, resulting in conflict and disillusion [31, 36].

There are several caveats to our findings. Firstly, surveys were done via an online questionnaire, thus generating concerns regarding potential selection and reporting biases [37, 38]. That being said, the response rate was relatively high for both mentors and mentees and at all time-points. Secondly, and due to the small sample size, it may be well that the study was underpowered, thus producing type II errors

and non-significant test results. Thirdly, the quantification of program effects could have been enhanced if more survey items had allowed ordinal scale responses rather than dichotomous responses. It has been shown that reliance on the latter leads to a loss of information and effect size and power [39].

Although the impact and importance of mentorship have been discussed at length, tangible suggestions for improving mentoring programs are equally valuable. To address these limitations, it is essential that the following be considered if this program is to be extended in its current settings or expanded beyond the confines of the CCLHD. Firstly, findings from future mentoring programs would be more generalisable and statistical analyses would be more powerful if the number of participants was increased. This could be achieved by increasing the response rate through reminders and incentives and/or expanding the program to include one or more adjacent health districts. To this end, it would also be beneficial if eligible non-participants were identified, such as junior doctors deemed to be in most need of a mentee-mentor relationship, plus mentors who are genuinely vested in the mentoring process. One only to peruse the 'mentoring landscape' to realise, that comparable mentoring programs in a medical setting have been conducted (and are being conducted) with participant numbers far in excess of those achieved in this study.<sup>40</sup> Secondly, gender imbalance in mentor participation needs to be addressed. While mentors of either gender should be equally effective, especially for female members, to support their academic activities [41–43], female mentors might be necessary for female mentees for a various reasons, such as their ability to serve as role models on combining the demands of their career with family commitments and better understand female mentees undergoing training [42, 44, 45]. Therefore, it is necessary to cultivate and recruit female senior medical staff as mentors. Thirdly, if the chosen survey was both valid and reliable, the quality of evidence from future studies on mentoring programs would be strengthened immensely.

## Conclusions

If implemented correctly and well-timed, mentoring undoubtedly has the necessary properties to enhance each participating party's professional and personal lives, be they doctors or not. As once stated by Winston Churchill, *"We make a living by what we get, but we make a life by what we give"*.

## Abbreviations

CCLHD: Central Coast Local Health District; GHD: Gosford District Hospital; IQR: Interquartile range; WPH: Wyong Public Hospital

## Declarations

### Acknowledgements

The author would firstly like to acknowledge study participants. Secondly, I would like to thank Stacey Poole in her contribution regarding data collection. Lastly, I would like to thank Sam Testa for his efforts

concerning proof-reading and providing comments/suggestions during the drafting process.

### **Authors' contributions**

MCD was responsible for all aspects of the manuscript, such as study conception and design, collection of the data, statistical analysis, and preparation of tables and writing of the manuscript.

### **Availability of data and materials**

All data generated or analysed during this study are included in this published article and its supplementary information files.

### **Funding**

This study received no funding.

### **Ethics approval and consent to participate**

Ethical approval for this study was obtained from the CCLHD Operational Research Committee. We confirm that all methods were carried out in accordance with relevant guidelines and regulations. Written informed consent was obtained from all the participants.

### **Consent for publication**

Not applicable.

### **Competing interests**

The authors declare that they have no competing interests.

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## **References**

1. de Janasz SC, Godshalk VM. (2013). The role of e-mentoring in protégés learning and satisfaction. *Group Organisation Management*. 2013; 38: 743–777.
2. Geesa RL, Brown RD, McConnell KR. Mentoring pathways program for first-year education doctor of education students: Perspectives of a program redesigned for sustainability. *Mentoring & Tutoring*. 2020; 28(2): 156–175.
3. Pietsch TA. Transition to e-mentoring: Factors that influence nurse engagement. *Computers, Informatics, Nursing*. 2012; 30: 632–639.

4. Rand ML, Pajarillo EJ. A robust and professional connection between master educator and Doctor of Nursing Practice (DNP) student instructor: Virtual mentoring and preceptorship via distance education. *Nurse Education Today*. 2012; 35: 696–699.
5. Switzer J, Switzer R. Student attitudes and preferences toward an E-mentoring program. A survey of journalism students. *International Journal on E-Learning*. 2015; 14: 97–112.
6. Department of Health. Mentoring for doctors: Signposts to current practice for career grade doctors. Available from <https://bit.ly/1En75le>. [Accessed 21 August 2021].
7. Joint Royal Colleges of Physicians Training Board: Academic Training. Available from <https://>. [Accessed 6 September 2021].
8. Mertz NT. What's a mentor, anyway? *Educational Administration Quarterly*. 2004; 40: –560.
9. Washington R, Cox E. How an evolution view of workplace mentoring relationships helps avoid negative experiences: The developmental relationship mentoring model in action. *Mentoring & Tutoring: Partnership in Learning*. 2016; 24(4): 318–340.
10. Alzerwi NA. Does academic performance affect the perceived value of mentorship, and mentor's influence on student's satisfaction: A cross-sectional study. *Journal of Evolution of Medical and Dental Sciences*. 2020; 9 (37): 2710–2716.
11. Nimmons D, Giny S, Rosenthal J. Medical student mentoring programs: Current insights. *Advances in Medical Education and Practice*. 2019; 10: 113–123.
12. Straus SE, Chatur F, Taylor M. Issues in the mentor-mentee relationship in academic medicine: A qualitative study. *Academic Medicine*. 2009; 84: 135–139.
13. Levy AS, Pyke-Grimm KA, Lee DA, et al. Mentoring in pediatric oncology: A report from the children's oncology group young investigator committee. *Journal of Pediatric Hematology/Oncology* 2013; 35: 456–461.
14. Dreher GF, Cox TH. Race, gender, and opportunity: a study of compensation attainment and the establishment of mentoring relationships. *Journal of Applied Psychology*. 1996; 81: 297–308.
15. Sullivan SE, Baruch Y. Advances in career theory and research: A critical review and agenda for future exploration. *Journal of Management*. 2009; 35: 1542–1571.
16. Hansford BC, Ehrich LC, Tennent L. (2004). Formal mentoring programs in education and other professions: A review of the literature. *Educational Administration Quarterly*. 2004.; 40(4): 518–540
17. Dobie S, Smith S, Robins L. How assigned faculty members view their mentoring relationships: An interview study of mentors in medical education. *Mentoring & Tutoring: Partnership in Learning*. 2010; 18(4): 337–359.
18. Nimmons D, Giny S, Rosental J. Medical student mentoring programs: Current insights. *Advances in Medical Education and Practice*. 2019; 10: 113–123.
19. Daresh J. Mentoring school leaders: Professional promise or predictable problems? *Educational Administration Quarterly*. 2004; 40: 495–517.

20. Rose GL, Rukstali MR, Schuckit MA. Informal mentoring between faculty and medical students. *Academic Medicine*. 2005; 80: 344–348.
21. Ehrich LC, Hansford B, Tennent L. Formal mentoring programs in education and other professions: A review of the literature. *Educational Administration Quarterly*. 2004; 40, –540.
22. Chao GT, Walz PM, Gardner PD. Formal and informal mentorships: A comparison on mentoring functions and contrast with non-mentored counterparts. *Personnel Psychology*. 1992; 45: 619–636.
23. Ragins BR, Cotton JL, Miller JS. (2000). Marginal mentoring: The effects of type of mentor, quality of relationship, and program design on work and career attitudes. *Academy of Management Journal*. 2000; 43: 1177–1194.
24. Sambunjak D, Straus SE, Marusic A. (2006). Mentoring in academic medicine, A systematic review. *Journal of the American Medical Association*. 2006; 296(9): 1103- 1115.
25. Yeung M, Nuth J, Stiell IG. Mentoring in emergency medicine: the art and the evidence. *Canadian Journal of Emergency Medicine*. 2020; 12(2): 143–149.
26. Commonwealth of Australia, Australian Bureau of Statistics (ABS). Australian Demographic Statistics, Dec 2016 (cat.no. 3101.0).
27. Lachin JM. Power and sample size evaluation for the Cochran–Mantel–Haenszel mean score (Wilcoxon rank sum) test and the Cochran– Armitage test for trend. *Statistics in Medicine*. 2011; 30: 3057–3066.
28. Raghunandana R, Shilpa M, Narayana K. Expectation of mentees toward mentoring in medical education – An observational study. *National Journal of Physiology Pharmacy and Pharmacology*. 2021; 11(3): 341–346.
29. Mohamed A, Antoni E. The essential role of mentors in medical institutions. *Advances in Medical Education and Practice*. 2016; 7: 671–672
30. Shanafelt TD, Sloan JA, Habermann TM. (2003). The well-being of physicians. *American Journal of Medicine*. 2003; 114: 513–519.
31. Taherian K, Shekarchian M. Mentoring for doctors: Do its benefits outweigh its disadvantages? *Medical Teacher*. 2009; 30(4): e95-e99.
32. Wingard DL, Garman KA, Reznik V. Facilitating faculty success: outcomes and cost benefit of the UCSD National Center of Leadership in Academic Medicine. *Academic Medicine*. 2004; 79(10): S9-S11.
33. Garr R, Dewe P. A qualitative study of mentoring and career progression among junior medical doctors. *International Journal of Medical Education*. 2013; 4: 247–252.
34. Ng YB, Lynch S., Kelly J, et al. Medical students' experiences of the benefits and influences regarding a placement mentoring programme preparing them for future practice as junior doctors: A qualitative study. *BMJ Open*. 2020; 10: e032643. doi:10.
35. Suliman S, Al-Mohammed A, Mohandadi DA, et al. The current practice of mentoring across Accreditation Council of Graduate Medical Education – International accredited programs in Qatar

- from faculty and trainee perspectives. *Advances in Medical Education and Practice*. 2018; 9: 69–74.
36. Eisen S, Sukhani S, Brightwell A, et al. Peer mentoring: Evaluation of a novel programme in paediatrics. *Archives of Disease in Childhood*. 2014; 99: 142–146.
  37. Bethlehem J. Selection bias in web surveys. *International Statistical Review*. 2010; 78(2): 161. –188.
  38. Kidd JC, Colley S, Dennis S. Surveying allied health professionals within a public health service: What works best, paper or online? *Evaluation & The Health Professionals*. 2019; 44. (3): 226–234.
  39. MacCullum RC, Zhang S, Preacher KJ, et al. On the practice of dichotomization of quantitative variables, *Psychological Methods*. 2002; 7: 19–40.
  40. Webb J, Brightwell A, Sarkar P, et al. Peer mentoring for core medical trainees: Uptake and impact. *Postgraduate Medical Journal*. 2015; 91(1074): 188–192.
  41. Han ER, Chung EK, Oh SA, et al. Mentoring experience and its effects on medical interns. *Singapore Medical Journal*. 2014; 55(11): 593–597.
  42. Levinson W, Kaufman K, Clark B, et al. Mentors and role models for women in academic medicine. *Western Journal of Medicine*. 1991; 154: 423–426.
  43. Palepu A, Friedman RH, Barnett RC, et al. Junior faculty members' mentoring relationships and their professional development in U.S. medical schools. *Academic Medicine*. 1998; 73(3): 318–323.
  44. Mahayosnand PP, Zanders L, Sabra ZM, et al. E-Mentoring female underrepresented public health student researchers: Supporting a more diverse post-pandemic workforce. *Health Security*. 2021; 19(S1): doi.org/10.1089/hs.2021.0042.
  45. Frei E, Stamm M, Buddeberg-Fischer B. Mentoring programs for medical students—a review of the PubMed literature 2000–2008. *BMC Medical Education*. 2010; 10: 32.