Mind the gap, factors that affect mentee's satisfaction in a formal mentorship program with arbitrary matching

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**Abstract**

**Introduction:**

The selection and matching process of mentorship programs impacts its success. We evaluated factors that may have the greatest impact on a program that employs arbitrary matching.

**Methods:**

A cross-sectional questionnaire-based study using the Munich Evaluation of mentoring questionnaire evaluating personal aspects of mentoring (PAM) and content aspects of mentoring (CAM) scores.

**Results:**

We enrolled 51 students, the main factors identified were sex matching and size of training gap. Male mentors assigned to male mentees achieved higher PAM scores than female mentors to male mentees (25.34±7.13 vs 20.5±7.36 p=0.002) as well as CAM scores (85.8±21.6 vs 73.2±24.9 p=0.02); this was not observed in female mentees. Students who were mentored by residents reported higher scores 16 vs 8, compared to those mentored by specialists 11 vs 16 low (p=0.05). Multivariate analysis found that the number of face-to-face meetings was the only significant variable that impacted the overall satisfaction of the mentorship program.

**Conclusions:**

In a formal mentoring program, gender concordance and age or level of training gap should be taken into consideration. The number of personal meetings relates to the success of the matching. It appears that mentees relate better to mentors who are closer to their age and training level and should be considered when matching is performed.
Keywords: Mentoring; Formal mentoring relationship; Medical training; Medical education

Introduction

Many medical schools offer a formal mentoring program which provides advantages throughout the different phases of medical training. Historically, studying and training to become of a physician was based on an apprenticeship relationship (Chopra, Edelson and Saint, 2016). Recently, modern medical schools have grown larger and some even reported that the personal connection between teacher and student or an apprenticeship relationship has been lost, leading to attempts to reestablish the apprenticeship connection through mentorship programs (Geerts, Goodall and Agius, 2020). In the last 5 years, a formal mentoring program was established at the Joyce & Irving Goldman Medical School, Ben-Gurion University of the Negev in Israel.

Mentoring programs in medical schools take on many different forms, they can be formal or informal, mandatory, or voluntary and can be offered in different stages of training. The areas covered by mentoring are wide ranging, from clinical work or research activities to professional relationships and career planning. However, mentoring should not be confused with counseling. The mentoring relationship is a private encounter, with total confidentiality given and expected on both sides (Peeraer, 2014).

Many advantages have been reported from mentorship programs, medical faculty who had mentors reported that mentoring positively influenced personal development, career guidance and overall productivity (Peeraer, 2014). Effective mentoring can increase career satisfaction and reduce faculty burnout as well as an increase in professional networking and collegiality (Kilminster and Jolly, 2000). Many medical schools use the formal mentorship approach in which the school assigns and matches the mentors and mentees in an arbitrary fashion. This approach, especially when a wide differential of power and status between mentors and mentees has been reported to be less successful eventually (Steven, Oxley and Fleming, 2008).

In the formal mentoring program of Joyce & Irving Goldman Medical School, students in the beginning of their clinical phase of training (4th or 5th year in a 6-year program) are matched to physicians to create a formal mentoring relationship. The program is not a mandatory part of medical training but is offered to every medical student in our institution. The mentors can be from various levels of physicians from interns through residents to staff physicians working in hospitals and clinics affiliated with Joyce & Irving Goldman Medical School. The students who take part in the mentoring program are asked to submit their personal preferences and requests regarding the preferred profession of the mentor (surgical, pediatrics etc.) and most of the students’ requests are met. This method of matching has been a matter of debate, and as there is little guidance on this topic in the literature, this study evaluated the success of our mentorship program through the satisfaction of the mentees and identify factors that influence and determine a successful matching.

Methods

Study design and population:

We conducted a cross sectional questionnaire-based study on medical students at Joyce & Irving Goldman Medical School. All medical students who were enrolled in the mentoring program in the years 2017 - 2018 were approached and asked to fill out a questionnaire. Authorization for this study was obtained from the medical school research ethics committee and students who filled out the questionnaire consented to participate. We included only students who actively participated in the mentorship program and had at least one private meeting with their mentor.

Research tool:

We used a two-part questionnaire to collect personal and demographic data about the mentees and to assess the
personal and contextual aspect of the mentoring relationship. The first part collected demographic information of the mentee as well as the mentor to the best of the mentee's knowledge, and included the type and number of meetings that occurred.

The second part of the questionnaire was the Munich Evaluation of mentoring questionnaire (MEMeQ) that was developed by Schäfer M and colleges (Schäfer et al., 2015).

The MEMeQ consists of two scores. First, a sum score for the personal aspects of the mentoring relationship (PAM, 0–30), and second an overall index score for the contextual aspects of the mentoring relationship (CAM, 0–100). Since it is not possible to weight personal and contextual aspects according to a fixed pattern we decided against a total score and each was evaluated separately.

Statistical analysis:

The statistical analysis was conducted using IBM SPSS Statistics 23 for Windows [Armonk, NY: IBM Corp]. After coding the questionnaires into a digital database, the primary statistical analysis of the data was performed to check if the quantitative variables were normally distributed and to choose the appropriate statistical test for each variable.

We validated the questionnaire by testing for correlation (using spearman correlation) between the general personal self-reported satisfaction of the students from the Mentoring relationship and the CAM and PAM scores. After a significant correlation was found, we assumed that the questionnaire was validated.

After validation, we categorized the student to "high score" and "low score" of CAM and PAM scores. Students with a score higher than the median score of the population were included in the "high score group".

Variables were summarized as frequencies and percentages, medians, means and standard errors. Univariate comparisons were performed with use of the chi-square test (Fisher’s exact test), and the Mann-Whitney test.

The multivariable analysis for identifying factors and predictors of high personal satisfaction with the mentoring relationship (PAM and CAM score) was performed using logistic regression. We performed a multivariable analysis using two binary logistic regression models: one for identifying independent factors that affect the mentoring relationship to be categorized as "high PAM score" and another model for independent factors that affect the mentoring relationship to be categorized as "high CAM score". All P values were two-sided, and P values of less than 0.05 were considered significant.

Results/Analysis

Of the 73 eligible students, 51 consent and enrolled in the study. We excluded 16 that did not meet even once with their assigned mentor, and 6 refused to participate. The Pearson correlation for validation of the questionnaires used in the study was 0.883 for the PAM and 0.77 for the CAM. Comparing those who had a male mentor to those assigned a female mentor, there was no difference in baseline demographics (Table 1), however, we observed a significant difference in both the PAM score (25.34±7.13 vs 20.5±7.36 p=0.002) as well as CAM score (85.8±21.6 vs 73.2±24.9 p=0.02).

Table 1: Study population demographic characteristics (n=51)

| Characteristics | Male mentor (n=29) | Female mentor (n=22) | All | p value |
|-----------------|-------------------|----------------------|-----|---------|
| Characteristics |                   |                      |     |         |
Comparing those who reported high PAM and CAM scores to those who reported low scores (Table 2) we observed a significant difference in the number of male mentees with male mentors PAM (10 vs 4 p=0.001) and CAM (12 vs 2 p=0.002), while males with female mentors were observed in the lower groups PAM (2 vs 9 p=0.009) and CAM (2 vs 9 p=0.014). This difference was not observed among the female mentees. The PAM high score group also included more students who were mentored by residents (16 vs 8) compared to staff physicians (11 vs 16) p=0.05.

Table 2: Comparing students grouped into low and high PAM and CAM scores

|                                    | PAM | CAM |
|------------------------------------|-----|-----|
|                                    | High score | Low score | p value | High score | Low score | p value |
| Gender: female                     | 15 (55.6%) | 11 (45.8%) | 0.488 | 12 (46.2%) | 14 (56%) | 0.482 |
| With female mentor                 | 6 (22.2%) | 5 (20.8%) | 0.904 | 5 (19.2%) | 6 (24%) | 0.679 |
| With male mentor                   | 9 (33.3%) | 6 (25%) | 0.514 | 7 (26.9%) | 8 (32%) | 0.691 |
| Gender: Male                       | 12 (44.4%) | 13 (54.2%) | 0.488 | 14 (53.8%) | 11 (44%) | 0.482 |
| With male mentor                   | 10 (37%) | 4 (16.7%) | 0.001 | 12 (46.2%) | 2 (8%) | 0.002 |
| With female mentor                 | 2 (7.4%) | 9 (37.5%) | 0.009 | 2 (7.7%) | 9 (36%) | 0.014 |
| Mean age ± SD                      | 28.6±1.9 | 28.9±1.1 | 0.992 | 28.8±1.3 | 28.6±1.8 | 0.668 |
| Marital status                     |     |     |     |     |     |     |
| Single                             | 15 (55.6%) | 15 (62.5%) | 0.615 | 14 (53.8%) | 16 (64%) | 0.461 |
| Married                            | 12 (44.4%) | 9 (37.5%) | 0.922 | 12 (46.2%) | 9 (36%) | 0.482 |
| With children                      | 4 (14.8%) | 5 (20.8%) | 0.574 | 3 (11.5%) | 6 (24%) | 0.243 |
| Residence                          |     |     |     |     |     |     |
| School area                        | 20 (74.1%) | 15 (62.5%) | 0.374 | 17 (65.4%) | 18 (72%) | 0.611 |
| Other                              | 7 (25.9%) | 9 (37.5%) | 0.922 | 9 (34.6%) | 7 (28%) | 0.243 |
| Place of birth                     |     |     |     |     |     |     |
| Israel                             | 25 (92.6%) | 20 (83.3%) | 0.3 | 24 (92.3%) | 21 (84%) | 0.357 |
| Other                              | 2 (7.4%) | 4 (16.7%) | 0.574 | 3 (11.5%) | 6 (24%) | 0.243 |
| Have a close family member who is a medical personal |     |     |     |     |     |     |
| Have a close family member who is a medical personal | 9 (33.3%) | 9 (33.3%) | 0.9 | 9 (34.6%) | 8 (32%) | 0.843 |
| The mentor's field of expertise    |     |     |     |     |     |     |
| Medical                            | 17 (63%) | 13 (54.2%) | 0.524 | 15 (57.7%) | 15 (60%) | 0.876 |
| Surgical                           | 10 (37%) | 11 (45.8%) | 0.574 | 11 (42.3%) | 10 (40%) | 0.876 |
We also observed a high correlation between the number of meetings and PAM scores, 10 in the high group compared to 3 in the low group p=0.003 and 9 in the CAM high score group and 3 in the CAM low score group p<0.001. Interestingly, the number of students with previous experience in mentoring relationships was higher in the low CAM score group than in the high score group- 10 (40%) and 3 (11.5%) respectively (p= 0.02)

Using multivariate analysis models, we found that the number of personal meetings was the only factor associated with both a high PAM score (OR=1.723, p=0.003) and a high CAM score (OR=1.278, p=0.017). The rest of the covariates used in the models were not found to be significant (Table 3).

**Table 3: Multivariate analysis of factors affecting PAM and CAM scores**

| Factors affecting the PAM score                        | O.R (95% C.I) | p value |
|--------------------------------------------------------|---------------|---------|
| Male with female mentor                                 | 0.93 (0.119-7.27) | 0.945   |
| Mentor's stage in the medical training                  | 0.365 (0.008-1.66) | 0.193   |
| Mentor specialty was compatible with the student request | 2.8 (0.2-39.9) | 0.429   |
| Number of personal meetings                             | 1.311 (1-1.61) | 0.01    |

| Factors affecting the CAM score                         | O.R (95% C.I) | p value |
|--------------------------------------------------------|---------------|---------|
| Male with female mentor                                 | 0.958 (0.124-7-395) | 0.967   |
| Previous mentoring relationship                         | 0.317 (0.05-1-71) | 0.182   |
| Mentor specialty was compatible with the student request | 4.8 (0.4-9-7) | 0.213   |
| Number of personal meeting                              | 1.27 (1-1.5) | 0.017   |

**Discussion**

In our study we have attempted to identify factors associated with successful mentoring relationships in a formal mentoring program. Our results suggest that specific factors need to be considered when assigning students to mentors in a formal mentoring program to increase the effectiveness of the mentoring relationship. The factors identified in our study are gender concordance between mentor and mentee, the mentor's career stage and the number of personal meetings between mentor and mentee.

Our results demonstrate that the gender of both the mentee and the mentor affects the satisfaction from the mentoring relationship and its effectiveness. We found that female medical students can establish effective mentoring relationships with either a male or a female mentor. However, male students did much better when
assigned to a male mentor than with a female mentor. Past studies have concluded that female faculty members are less likely to advance academically than their male colleagues of comparable seniority and it is evident that specific mentoring is required at all levels of academia to ensure the success of women in their careers (Kosoko-Lasaki, Somnino and Voytko, 2006; Nattinger, 2007). Examining the gender issues in mentorship programs has been a topic of much debate recently with different expert opinions and mixed conclusions about the effects of gender on mentoring relationships. For example, one study that was conducted on female engineering students found that same-gender peer mentoring for a short period during developmental transition points promotes women's success and retention in engineering, yielding dividends over time (Dennehy and Dasgupta, 2017). Alternatively, a study by Levine et al. that described a formal mentoring program for 3rd and 4th year female medical students concluded that relational mentoring is more important than gender concordance. In their study, students identified a desire for access to female mentors but stated that when a mentor and mentee developed a personal connection, the gender of the mentor was less important (Levine et al., 2013). Our results support the notion that when a personal connection is formed the gender issue becomes less important. In our mentoring program, the number of personal meetings had the most significant effect on mentorship satisfaction/the program's success, and we can assume that a high number of personal meetings represents a good personal connection in the mentoring relationship. In a multivariate analysis, after correction for the number of personal meetings, the gender concordance affect was not found to be significant. An alternative explanation to the fact that gender issue had no effect in the multivariate analysis due to the relatively small number of students in our study.

It has been reported that formal mentoring relationships that are characterized by large power and status differentials (department/division heads with medical students for example) are less successful eventually (Peeraer, 2014). Our study strengthens this notion as we observed that mentors who were still in their residency and thus much closer in both age and career phase to their mentees were associated with higher PAM scores compared to specialists or staff physicians. The effect is due to smaller age and power differences and having more in common with the mentor. Another possible explanation for our results is the fact that feedback by the mentees on the mentors' function during the time of the mentoring relationship is a key component to successful mentoring. Medical students are more likely to accept feedback from a mentor with smaller power and status gap during the mentoring time frame (Chopra, Edelson and Saint, 2016). Although this factor was not found to be significant in multivariate analysis, we suggest that the mentor's seniority should be taken into consideration among other factors.

Finally, the number of personal meetings between the mentor and student was much higher in the more effective mentoring relationships. This may be a cause or it may be an effect, and a result of a good connection between the mentor and mentee. At this point we cannot conclude if a high number of meetings is due to a well-established relationship or if mandating a specific number of meetings between the mentor and mentee will improve the relationship. However, since a high number of personal meetings were the only independent factor associated with a significantly more effective formal mentoring relationship in our study, we suggest that when starting a formal mentoring relationship, students and mentors meet in person as much as possible to form an effective relationship.

**Strengths and limitations:**

The first limitation of our study is the small size, which limits the generalizability of our study's results. Second, as this was a cross sectional study, there may have been recall bias. Our study's strength is the use of internationally accepted tools for evaluating the mentorship program in our medical school. Hence, we will be able to measure its success and compare it to other similar programs in medical schools worldwide.

**Conclusion**

When assigning mentors to the mentees in a formal mentoring program, gender concordance and gap of training
should be taken into consideration, furthermore, promoting a high number of personal meetings should also be an important goal.

**Take Home Messages**

- Interns and Resident mentors generated the greatest satisfaction in mentees.
- Gender matching is important especially to male mentees.
- The number of personal meetings was associated with greater satisfaction.

**Notes On Contributors**

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**Appendices**

None.

**Declarations**

The author has declared that there are no conflicts of interest.

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**Ethics Statement**

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