



## DUNNING KRUGER PHENOMENON AMONG MEDICAL COLLEGE FACULTY IN KARNATAKA, INDIA: IMPLICATIONS FOR FACULTY DEVELOPMENT

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**ABSTRACT** **Background:** Medical college teachers do not receive formal training in teaching learning methods and are recruited on the basis of their master degrees and publications. Dunning Kruger phenomenon explains the progression of a novice teacher to expert teacher over a period of time. The length of this period has many determinants and hence is varied. Dunning Kruger phenomenon which explains difficulty in assessing one's own competence or ignorance about one's pedagogical skills is a good method to assess the need for faculty development programs.

**Methods:** The study had the objectives of estimating the prevalence of DK phenomenon and its distribution based on the speciality and experience of faculty.

The study was conducted among 92 faculty members from 5 Medical Colleges in the State of Karnataka. This study was done in conjunction with the revised basic medical education technology (MET) workshops. We used standardized tools of measurement (self-perceived skills versus objective rating of skills) for plotting the DK curve.

**Key findings:** DK-phenomenon was prevalent among faculty from all specialties but was pronounced among clinical faculty. This was more prevalent in assessment domains. Increasing teaching experience was associated with lesser DK-phenomenon with faculty members. The basic MET workshops although were perceived to be useful, were insufficient to specifically reduce the DK-phenomenon.

**KEYWORDS :** Dunning Kruger Phenomenon, revised basic MET workshop, self-perceived skills

### INTRODUCTION:

In what is now a widely cited paper, Cornell University psychologists David Dunning and Justin Kruger, described evidence supporting the concept of 'unskilled and unaware' among learners. They observed that unskilled subjects (i.e. subjects who scored low on a variety of tests) overestimated their own performance (indeed, thought themselves above average) and lacked the meta-cognitive ability (unaware) to recognize that this was the case. Nor could they accurately assess the performance of others. They also found it difficult to respond effectively to feedback in this state, but where it did prove possible to improve their metacognitive ability with training, their self-assessment ratings tended to improve. Conversely, skilled subjects tended to slightly under-rate their own performance, but this improved after feedback. This phenomenon came to be known as the Dunning-Kruger phenomenon (DK-phenomenon). While this phenomenon was shown in experimental settings unrelated to clinical medicine, the medical fraternity too has such "unskilled and unaware" learners – both among students and especially among faculty.<sup>1</sup>

### DK-phenomenon in medical education

Subsequent studies on related theme have demonstrated that ignorance and trust to do the right thing with the correct learned, memorized and understood tasks can be associated directly with DK-phenomenon within the medical faculty. Because they are unaware of their shortcomings, they tend to develop a cognitive bias, leading them to a belief in their own competence or even superiority where the opposite should exist.<sup>2,3</sup> In contrast, those senior physicians and surgeons who are, in fact, "skilled" and perhaps "more aware" often suffer from a feeling of inferiority. They often assume their abilities to be merely average as their minds are focused on everything they yet to learn. In short, they realize that the more one knows, the more one then knows, how much one does not know.<sup>1</sup>

To address the potential consequences of such biases, it is important for medical education/faculty development programs to be designed to identify, address and continuously support such group of learners in difficulty at all levels. More importantly, the existence and inevitability of such biases inherent during one's learning curve both during student and professional life should be made more widely known. This can help to create effective debiasing strategies and cultivating awareness of confirmation, anchoring, and outcomes biases.<sup>2,3,4,5</sup>

An often-used tool in behavioral and management sciences is the self-

assessment method. There are a variety of self-assessment tools available, each however with its own limitations. The ability for self-assessment among medical students and practicing physicians is generally poor yet is essential for academic progress and professional development.<sup>6</sup>

This difficulty may be exaggerated in unskilled learners due to the phenomenon of DK-phenomenon. Learners with the least amount of knowledge or skill may paradoxically be more likely to evaluate themselves favorably compared with their peers.<sup>1</sup> This phenomenon is particularly relevant in medicine where there is heavy reliance on self-directed learning not only in many of our undergraduate and postgraduate programmes, but in guiding the pursuit of continuing medical education and faculty development programmes.

Medical college teachers do not receive formal training in teaching learning methods and are recruited on the basis of their master degrees and publications. Dunning Kruger phenomenon explains the progression of a novice teacher to expert teacher over a period of time. The length of this period has many determinants and hence is varied. Dunning Kruger phenomenon which explains difficulty in assessing one's own competence is a good method to assess the need for faculty development in medical colleges. Medical education technology workshops are designed to increase the expertise of teachers in areas of teaching-learning and assessment methods and thereby address the DK phenomenon.<sup>7</sup>

### Objectives of the study

1. To study Dunning Kruger phenomenon among the medical college faculty
2. To study the distribution of Dunning Kruger effect among teachers according to their teaching experience and in different TL and assessment methods.
3. To study the impact of revised basic medical education technology workshops on Dunning Kruger effect.

### Study methodology

This study was approved by the Institutional Ethics Review Committee of the Mysore Medical College and Research Institute (MMCRI), Mysore. The study was conducted among 92 faculty members (42 from preclinical, 30 from paraclinical, and 20 from clinical specialties) from 5 Medical Colleges in the State of Karnataka, India between November 2017 and November 2018. This study was

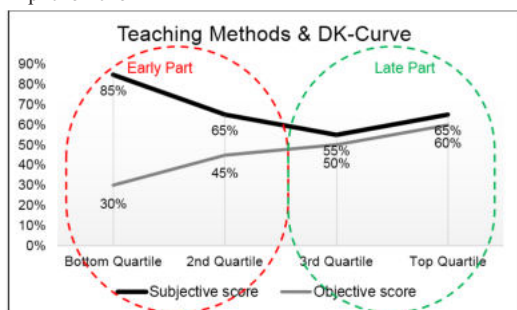
done in conjunction with the revised basic medical education technology (MET) workshops that the faculty members were attending. These MET workshops were envisaged by the Medical Council of India to emphasize on competencies in a move towards competency Based Medical Education and help the medical faculty develop the knowledge and skills in principles and application of educational technology.

We invited all the faculty members attending these workshops for a pre and post workshop assessment by using standardized tools of measurement. Paired test was done to assess the difference in pre and post test scores among the participants of revised basic workshop. Chi square test was used for categorical variables

A structured questionnaire was prepared to include 2 categories of questions – subjective perception & objective knowledge & expertise. The parameters objectively assessed, included teaching competencies related to all aspects of medical undergraduate teaching – teaching, medium of teaching including use of educational technology tools and theoretical and practical assessment. Apart from their basic socio-demographic and background educational details, we assessed their subjective perception using a 5-point Likert's scale with 1 representing very poor perception to 5 representing very good perception. The knowledge and expertise were assessed using questions in a binary – YES or NO format. All the parameters were individually scored for both subjective and objective assessment. These scores were then plotted on a DK-curve in 4 quartiles.

**RESULTS**

The visual below is an illustration of the DK-curve based on scores for teaching methods. The gap between objective evaluation and subjective perception, ideally should be approximate, whereas in reality, we noted gaps especially in bottom quartile, denoting existence of DK-phenomenon



**Fig1: DK-Curve depicting the subjective & objective scores**

The scores were then subsequently correlated with the faculty members' teaching specialty, number of years of teaching experience, use of various teaching-learning assessment methods.

**Table 1: DK-phenomenon in relation to the teaching discipline of the faculty**

Discipline	Position in DK-Curve				Total
	Early Part		Late part		
	N	%	N	%	
Preclinical	31	73.8%	11	26.2%	42
Paraclinical	23	76.7%	7	23.3%	30
Clinical	18	90%	2	10%	20
Total	72	78.3%	20	21.7%	92

The DK-phenomenon was noted to be more conspicuous among the clinical faculty than the pre or Para clinical disciplines. This difference was not statistically relevant.

**Table 2: DK-phenomenon in relation to the number of years of teaching experience of the faculty**

Experience in years	Position in DK-Curve				Total
	Early Part		Late part		
	N	%	N	%	
Less than 5 years	19	90.5%	2	9.5%	21
5 to 10 years	27	79.4%	7	20.6%	34
10 to 15 years	15	62.5%	9	37.5%	24
More than 15 years	11	84.6%	2	15.4%	13
Total	72	78.3%	20	21.7%	92

The chi- square statistic is 5.1402, p>0.05

Majority of the respondents in the study had less than 15 years of teaching experience. DK-phenomenon was notable in the two extremes of the teaching experience spectrum – in faculty with less than 5 years of teaching experience as well as in those with more than 15 years of experience. But this finding lends credence to the hypothesis that the “more skilled” and perhaps “more aware” often suffer from a feeling of inferiority. They often assume their abilities to be merely average as their minds are focused on everything they yet to learn.<sup>2</sup>

**Table 3:DK-phenomenon in relation to the teaching-learning & assessments (TLA) methods employed**

Area of TLA expertise	Position in DK-Curve				Total
	Early Part		Late part		
	N	%	N	%	
Lecture class	21	22.8%	71	77.2%	92
Practical/clinical demos	29	31.5%	63	68.5%	92
Education technology media	13	14.1%	79	85.9%	92
Theoretical assessment	50	54.3%	42	45.7%	92
Practical/clinical assessment (OSPE/OSCE)	71	77.2%	21	22.8%	92

The chi- square statistic is 38.7604, p<0.00001

The scores in the subjective perception and the objective assessment of knowledge and expertise when plotted against various teaching-learning & assessment techniques help understand the specific areas of cognitive biases. This could further help better design of debiasing strategies.

We noted that DK-phenomenon was predominant in the assessment domains and in particular the practical/clinical assessment domains. This association was statistically significant.

**Table 4: DK-phenomenon in relation to participation in previous MET workshops**

Participation in MET workshops	Position in DK-Curve				Total
	Early Part		Late part		
	N	%	N	%	
Yes	37	68.5%	17	31.5%	54
No	35	92.1%	3	7.9%	38
Total	72	78.3%	20	21.7%	92

The chi- square statistic is 7.2935, p<0.00001.

54 faculty members had attended the MET workshops on occasions prior to the present study while 38 of them attended the MET workshops for the first time during the study. We do find some statistically significant association between higher DK-phenomenon among faculty members without previous trainings through the MET workshops.

**Table 5 Pre and Post MET workshop scores**

Score characteristic	Pretest score	Posttest score
	Max.25	Max 25
Mean*	16.98	22.41
Std Deviation	3.97	1.67
Minimum Score	10	18
Maximum Score	25	25
Mode	16	23
Percentage	65	89.8
p Value	p<0.001	

To study the effect of participation in the MET workshops on the DK-phenomenon, we compared the scores before and after the workshops.

**DISCUSSION**

The study demonstrates the “unskilled and unaware” phenomenon being widely prevalent among medical teaching faculty. The study points to areas where DK-phenomenon is potentially more prevalent among medical faculty noting the discipline and seniority level differences as well as within various TLA methods employed. It was more common in assessment component. The apparent increase in the

DK-phenomenon noted with increasing teaching experience of faculty members needs to be probed further. The significant difference in scores within teaching learning and assessment domains points to the deficiency of structure and objectivity in assessment methods. This can have serious implications on the quality of graduates passing out from medical schools.<sup>8</sup>

Trainings through the MCI mandated basic MET workshops did show to have some effect in short-term reduction in the DK-phenomenon, it was not clear whether there were any ongoing initiatives for supporting the faculty and for reinforcing the learnings from the MET workshops.

The authors would also like to draw the attention to some pertinent issues keeping the medical education landscape within India in perspective. India is home to the largest number of medical colleges in the World. There were 494 medical schools in India in 2019. The medical graduates passing out from its colleges form the backbone of the health sector of the country and thus ensuring medical education quality imparted to them to be truly World Class teaching faculty cannot be overemphasized. Thereby effectiveness of continuing faculty development initiatives such as MET workshops becomes critical. For these initiatives to succeed in their stated objectives there is a need to acknowledge existent of cognitive biases among learners and design strategies to address them.<sup>9,10,11</sup> This study helps to understand the cognitive biases and debiasing strategies that may be put in place.<sup>12</sup>

### Conclusions and recommendations

- Dunning Kruger effect is highly prevalent among medical teachers (78%) among the colleges studied.
- Dunning Kruger effect is predominant in clinical faculty and most common in practical/clinical skills assessment domains.
- Dunning Kruger effect decreases with teaching experience of more than 10 years.
- Medical education technology workshops are useful but not enough to get rid of Dunning Kruger effect
- At the very outset, there is need for advocacy and creating wider awareness about the existence of this bias among teaching faculty. Awareness is a necessary step to acceptance and designing specific solutions. Specifically, there is a need for designing more robust, objective and scalable tools to better quantify the extent of DK-phenomenon and the possible determinants of this phenomenon.

**Conflict of interest:** None

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