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NON AVAILABILITY OF HUMAN RESOURCE FOR HEALTH IN RURAL INDIA: ARE WE MISSING OUT ON SOME CRITICAL LINK?

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ABSTRACT

There continues to be an acute shortage of skilled human resource for health in rural areas, across developing countries. To increase the availability of human health resources in rural India is a key priority of National Rural Health Mission (NRHM), 2005-2012. However, distribution of doctors remains highly skewed towards urban areas in India. The aim of the study was to identify principal factors that govern a medical students decision making for joining rural health service, to rank the various incentives desired by medical students and to make relevant recommendations. A cross sectional study at a medical college in the state of Uttar Pradesh, in India. The study unit comprised of willing MBBS students, interns and MBBS pass-outs. A sample of 140 participants was obtained using simple random sampling. The study was done in two phases applying both qualitative and quantitative research methodology. Statistical analysis was done using Principle Component Analysis, mean score on Likert scale & Mean inverted weighted score on Dockert scale. On PCA, desired incentives for rural service aligned along three factors, namely, 'Financial incentives and opportunity for skill upgradation', 'Improved quality of life' and 'Opportunities for higher in-service education'. Good housing and posting in/ close to home were most preferred incentives. Financial incentives were least preferred. The current strategy of drawing medical students towards rural service by offering "Reservation for Post Graduation" had very few takers. A desire for "Improved quality of life" was the major determinant with high potential to attract medical graduates to rural health posts.

Key Words: *Rural health, MBBS student aspirations, Quality of life, Factor analysis*

INTRODUCTION

India faces a serious problem of inequitable distribution of human resources for health. Majority (68.8%) of Indian population resides in rural areas; however doctors in both public & private sector are mostly concentrated in urban areas (Census 2011). The density of doctors & nurses is three to four times higher in cities compared to rural areas (Raha *et al.,* 2009). About one in ten doctors work in a rural area, with only a fraction of rural health centers having the necessary physicians, surgeons & other personnel (Press information bureau, 2007).

Government has tried a number of strategies to augment health facilities in rural areas without much success. Eleven states, Assam, Arunanchal Pradesh, Chhattisgarh, Gujarat, Kerala, Manipur, Meghalaya, Nagaland, Orissa, Tamil Nadu and West Bengal have made it compulsory for all medical graduates to serve in rural areas for a duration varying from one to five years (Rao et al, 2011). Other measures aim at taking advantage of desire among medical graduates for post-graduate (PG) specialization by "Pre-PG Compulsion" or "In-service PG incentive" or "Post-PG Compulsion".

Policymakers have opened medical colleges in rural areas, designed admission policies reserving a small proportion of seats for medical college applicants coming from rural areas, devised innovative programmes to expose medical students to the realities of rural healthcare and started community placement programmes (Kalantri, 2007).

Financial incentive like "difficult area allowance" has also been used to lure skilled health personnel to rural areas. Other strategies include employing retired doctors, group housing for health workers living in remote areas with basic amenities and security, etc.

Recently, it has been in news that to address the shortfall of doctors in rural India, the Medical Council of India is starting an innovative Bachelor of Rural Medicine and Surgery (BRMS) degree [a three-and-a-half year crash course in medicine against the usual five-and-a-half year MBBS] (Anon,

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2009). A BRMS degree holder will be an "additional workforce" and shortened training will not compromise health care quality (Jayaraman, 2010). A sharp debate has ensued with medical fraternity generally opposed to the new degree on the grounds that shorter duration will result in inadequately trained professionals (Mascarenhas, 2010 and Anon, 2010).

Amidst all these recent developments, this study was done to identify principal factors that govern a medical students decision making for joining rural health service, to rank the various incentives sought after by medical students and to make relevant recommendations.

MATERIALS AND METHODS

A cross-sectional study was conducted at a government medical college in eastern Uttar Pradesh, India. The study unit consisted of willing MBBS students, interns & MBBS pass outs. The sample size was estimated using "Rule of 100", widely used in factor analysis. As per "Rule of 100" -"No sample should be less than 100 even though number of variables is less than 20". Adding 20% for non-response/ absenteeism and 20% for incomplete information, a desired sample size of 140 subjects was obtained. A total of 140 participants were selected for the study from a total of 270 using a simple random sampling.

The study was done in two phases. In the 1st phase, four Focused Group Discussion (FGD) were done, each with 12 randomly chosen and willing participants to collect the variables (desired incentives) for rural service. Using the desired incentives cited by participants in first phase, a self-administered structured questionnaire was designed at the department of community medicine. The study tool comprising of a self-administered semi-structured questionnaire, with possible responses to selected variables arranged over a Five-point Likert scale (1 to 5) & 'Dockert scale' was pretested on 10% of the sample size (Ockert , 2005). Only these variables with high discriminatory power were included in the final questionnaire. In the second phase, the participants were handed out the questionnaire after obtaining a written consent. Complete confidentiality of their personal data and choices made was ensured. Complete anonymity over questionnaire was maintained by asking participants not to mention their name or sign the questionnaire anywhere. The response rate was 94.3%. Both English & Hindi were used to communicate during FGD & explaining the questionnaire. Ethical clearance was obtained from the departmental (community medicine) research review cell.

Statistical analysis was done with SPSS 16.0 for Windows©, using Factor analysis [Principle Component Analysis- Rotated component matrix- Varimax with Kaiser Normalization), Mean score on Likert scale, Mean inverted weighted score on Dockert scale and Average weighted rank. Factor analysis is a variable reduction technique that identifies the number of latent constructs and the underlying factor structure of a set of variables. It capitalizes on similarities and differences in responses both between the entire individual respondent's responses and that then in relation to all other respondents as a whole. Individuals who respond similarly on certain questions will form a factor group because they "*match*" in terms of what they score high on as well as score low. Two or more variables may receive same score on Likert scale. Dockert scale is different in that, it allows the participant to rank the variables with same ranking on Likert score. It thus serves as a tie breaker.

RESULTS

Of the 140 participants enrolled for the study, eight (5.7%) did not turn up and three (2.1%) were excluded from analysis due to incomplete information provided. Thus final analysis was done on 129 participants. Among the 129 participants, 92 (71.3%) were male & 37(28.7%) were females. Majority of participants (92.2%) were Hindus. About 68 (52.8%) students belonged to unreserved category, while 37 (28.7%), 20 (15.5%) & 4 (3.1%) belonged to backward castes, schedule castes & schedule tribes respectively. About 56(43.4%) students had a rural background; rest 73 (56.6%) were from urban areas.

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Table 1: Principal Component Analysis of desired incentives for rural service (Rotated component matrix- Varimax with Kaiser normalization)

Variables	Factor 1: Financial incentives and chance for skill upgradation	Factor 2: Improved quality of life	Factor 3: Opportunities for higher in-service education
Legalization of private practice	0.761	0.096	0.051
Faster promotions	0.660	0.326	0.173
Higher salary and allowances	0.647	0.071	0.296
In-service training & skill upgradation	0.582	0.230	0.235
Sponsorship for studies abroad	0.531	-0.002	-0.349
Post-specialization posting at DH/CHC only	-0.125	0.808	0.171
Good housing, security and school for children	0.367	0.729	-0.042
Posting in/ close to home town	0.433	0.713	-0.063
Reservation in PGMEE after a period of rural service	0.037	0.071	0.802
Direct selection in post-graduate diploma courses	0.250	0.004	0.700

Table-1 shows the factor analysis of selected incentives for joining rural health service. On applying Principle Component Analysis (PCA) the ten selected variables aligned into three factors. The first factor appears to be a measure of desire for 'Financial incentives and skill upgradation', with high loadings for 'Legalization of private practice for rural practitioners', 'Faster promotions', and 'Higher salary and allowances'; and to a lesser extent, 'In-service training & skill upgradation' and 'Sponsorship for studies abroad'. The second factor is a measure of desire for 'Improved quality of life', with comparatively higher loadings for 'Post-specialization posting at District hospital/ Community Health Centre only', 'Good housing with 24 hours supply of water & electricity, with security and good schooling facilities for children' and 'Posting in/ close to home town'. The third factor is a measure of desire for 'Opportunities for higher in-service education', with high loadings for 'Reservation in Post Graduate Medical Entrance Exam (PGMEE) after a period of rural service' and 'Direct selection in post-graduate diploma courses'. The Kaiser's overall Measure of Sampling Adequacy (MSA) is 0.729, and three factors explained 55.9% of the common variance as per PCA.

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Table 2: Dockert analysis of expected incentives for rural service

Variable	No of times ranked #1	No of times ranked #2	No of times ranked #3	No of times ranked #4	No of times ranked #5	Total No. of top 5 hits	Percentage of students ranking this variable in Top 5
Legalization of private practice	9	3	10	12	13	47	36.43
Faster promotions	8	12	18	22	12	72	55.81
Higher salary and allowances	6	10	16	7	21	60	46.51
In-service training & skill up gradation	16	8	18	17	19	78	60.47
Sponsorship for studies abroad	8	9	4	10	10	41	31.78
Post-specialization posting at DH/CHC only	5	9	11	18	9	52	40.31
Good housing, security and school for children	16	29	23	14	14	96	74.42
Posting in/ close to home town	17	28	20	16	13	94	72.87
Reservation in PGMEE after a period of rural service	36	6	5	5	9	61	47.29
Direct selection in post-graduate diploma courses	8	15	4	8	9	44	34.11

Table 2 shows the "5 point" inverted weighted Dockert score analysis of response of study subjects to incentives for rural service. To determine this score, an activity received 5 points each time it was ranked 1st, 4 points each time it was ranked 2nd, 3 points each time it was ranked 3rd, etc. The sum of these points was then divided by the number of students to determine the inverted weighted Dockert score. The two activities that were chosen as the most preferred were "Good housing with 24 hours supply of water & electricity, with security and good schooling facilities for children" (74.42 %) and "Posting in/ close to home town" (72.87 %). "Sponsorship to rural practitioners for studies abroad"

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(31.78 %) & "Direct selection in post-graduate diploma courses" (34.11%) were the least preferred responses.

Table 3: Comparative rankings of desired incentives for rural service on Likert & Dockert scales

Likert scale			Dockert scale		
Rank	Variable	Mean Score	Rank	Variable	Mean weighted score
1	Good housing with 24 hours supply of water & electricity, with security and good schooling facilities for children	4.163	1	Good housing with 24 hours supply of water & electricity, with security and good schooling facilities for children	2.380
2	Posting in/ close to home town	4.086	2	Posting in/ close to home town	2.341
3	In-service training & skill upgradation	3.898	3	Reservation in PGMEE after a period of rural service	1.845
4	Faster promotions	3.844	4	In-service training & skill upgradation	1.698
5	Post-specialization posting at DH/CHC only	3.535	5	Faster promotions	1.535
6	Sponsorship for studies abroad	3.531	6	Higher salary and allowances	1.186
7	Reservation in PGMEE after a period of rural service	3.527	7	Post-specialization posting at DH/CHC only	1.078
8	Higher salary and allowances	3.457	8	Direct selection in post-graduate diploma courses	1.062
9	Legalization of private practice	3.400	9	Legalization of private practice	0.961
10	Direct selection in post-graduate diploma courses	2.992	10	Sponsorship for studies abroad	0.915

Table 3 shows the comparative ranking of selected variables (incentives) on Likert and Dockert scales. "Good housing with 24 hours supply of water & electricity, with security and good schooling

facilities for children" & "Posting in/ close to home town" that aligned into one factor "'Improved quality of life" in factor analysis ranked 1st & 2nd on both Likert & Dockert scales. Variables that aligned with the factor "Financial incentives and skill upgradation" like 'Financial incentives' & 'Legalization of private practice' were among least preferred incentives with rank 8 & 9 on Likert scale and rank 6 & 9 respectively on Dockert scale. On calculating inverted weighted score for ranks of variables as per their alignment in factor analysis, "Quality of life" came out as the most important factor on both Likert (8.33) & Dockert (7.67) scales.

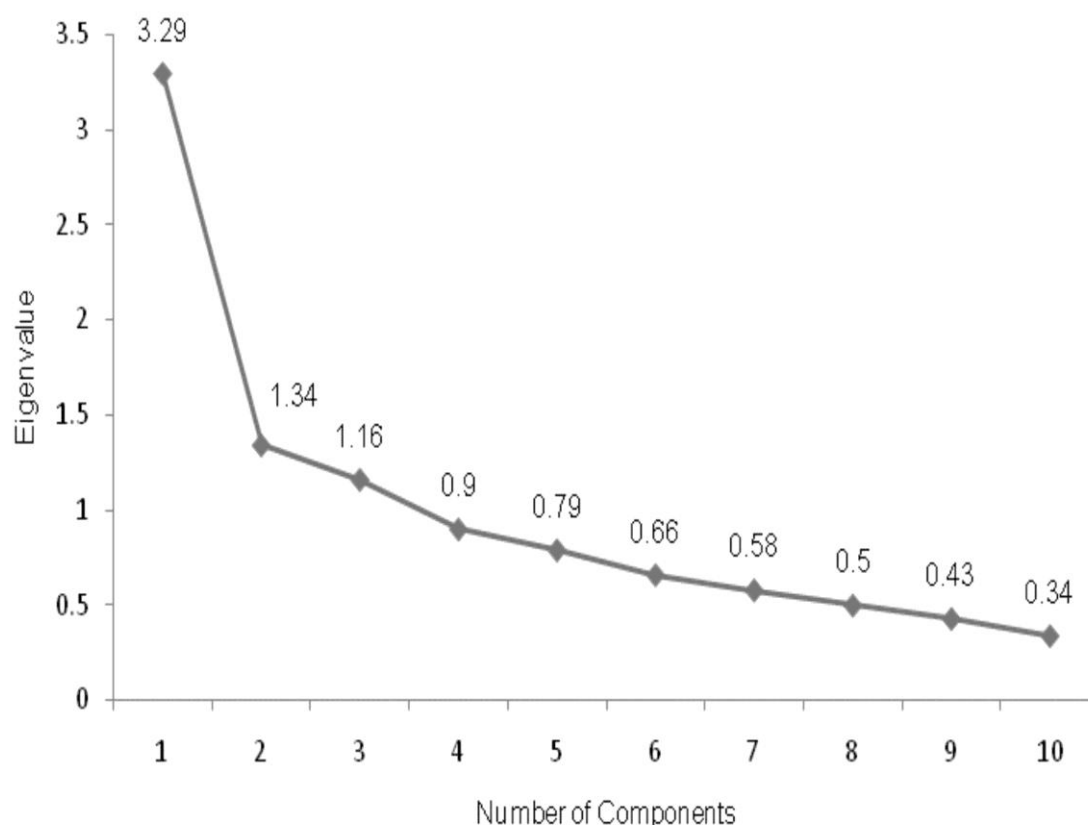**Figure 1: Scree plot for determination of number of components**

Figure 1 displays the scree plot. The shape of the plot is used to determine the number of factors that fall before the plotted curve turns sharply right or the number of factors above the bend in the knee, these factors are extracted & they explain high common variance. As can be seen from the above graph, from the third factor onwards, the curve is almost flat, meaning that each successive factor is accounting for smaller & smaller amount of total variance. In the current study three major factors were extracted.

DISCUSSION
The current study urges to find out the incentives/ facilities that could make rural service lucrative to fresh medical graduates and undergraduate medical students (i.e. MBBS). Highest rankings were given to 'Good housing with 24 hrs supply of water & electricity, with security and good schooling facilities for children' (mean score of 4.163 on Likert scale) and 'Postings in/ close to home town' (mean score of 4.086 on Likert scale). Other top-five incentives included 'In-service training and skill

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upgradation', 'Faster promotions in rural service' on both Likert and Dockert scales. The fifth one was 'Post-specialization postings at District Hospital/ Community Health Center only' on Likert scale, and 'Reservation in PGMEE after a fixed period of rural service' on Dockert scale. Murthy et al (2012) suggested 'higher salaries for doctors in rural areas', 'good infrastructure for rural hospitals', 'improved learning opportunities and reservation in post-graduate education', 'improved quality of life with security, living facilities, schooling for children', and 'proximity to family' as possible incentives for higher number of rural recruitments and retention. The incentives suggested by medical graduates in the current study are similar to those suggested by Murthy et al (2012), with additional incentives like 'Legalization of private practice for rural practitioners', 'Sponsorship to rural practitioners for studies abroad', and 'Post-specialization postings at District Hospital/ Community Health Center only'.

On doing a Principle Component Analysis of responses to suggested incentives three major factors i.e 'Improved quality of life', 'Financial incentives and chances for skill upgradation', and 'Improved chances of higher in-service education' came to light. On ranking the response for individual incentives on Likert and Dockert Scales, highest inverted weighted ranks were obtained for variables that aligned for 'Improved quality of life' on both scales. This shows the apprehension of living a poor quality of life while serving in rural areas is greater than the charm for higher salaries or reservation in post-graduation. It is noteworthy that provision of monetary incentives and reservation in post-graduate courses has been the main strategies thought-off by policy makers and provided by different governments to increase availability of doctors in rural areas (Kalantri, 2007). Raha et al (2009) reported that for most medical students, a respectable salary, opportunity to utilise skills, good living condition & a safe working environment were the most prominent essential criteria for a first job. Workload & further training opportunities were least important when considering a job.

In another article by Kinra and Yoav (2010) the feasibility of a short duration rural MBBS course was discussed. However, in the current study, none of the participants commented on this issue. It is clear from our study that students irrespective of rural or urban background were willing to pursue a regular MBBS course & serve in rural areas provided the policy-makers lay more emphasis on providing an improved and descent quality of life.

CONCLUSION
'Financial incentives and skill up gradation', 'Improved quality of life' and 'Opportunities for higher in-service education', were the principal factors influencing the decision making of medical students for rural service. However "Quality of life" came out as the most important driving force to attract medical graduates to rural health posts. "Direct selection in post-graduate diploma courses" the present strategy being used by most state governments across India was among the least preferred responses. Forcing only young doctors to go through a compulsory rural stint for higher education to fill the vacant posts of doctors, when there is no such policy for engineers, management graduates etc is dampening the spirits of many who have entered the medical field. The current strategy needs to be reviewed or else it may result in young intelligent brains abstaining from a career in medical science.

Limitation of the Study
The study is restricted to just one medical college in UP for lack of sufficient monetary and manpower resources. The students admitted at the chosen centre are selected through 25% All India pre-Medical Test and 75% through Combined Pre-Medical Test. Although we cannot claim that the sample is representative of all medical students, but still, it represents students from different regions. A multi centric study is planned in future. It can possibly give slightly different results with better representation of medical students in the state/country.

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