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Career Certainty and Awareness of Medical Career Pathways Among First-Year MBBS Students During the Foundation Course: A Cross-Sectional Study

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ABSTRACT

Background: Early career awareness and certainty among medical undergraduates influence specialty distribution, motivation, and professional identity formation, underscoring the importance of structured career guidance. In India, the National Medical Commission (NMC) Foundation Course provides a formal opportunity for structured exposure to career pathways, however, limited data exist on first-year students' baseline career clarity and informational needs. This study assessed career certainty, awareness of medical career trajectories, and perceived influences guided by Social Cognitive Career Theory, among newly admitted MBBS students, and evaluated the immediate perceived effects of a structured career-guidance session.

Methods: A cross-sectional questionnaire-based study was conducted among first-year MBBS students during the NMC Foundation Course (2025-26) at a government medical college in Telangana, India. A content-validated and pilot-tested questionnaire captured demographic characteristics, parental employment status, awareness of career options, perceived influences and barriers, and baseline career certainty. Post-session feedback evaluated perceived usefulness and short-term changes in career certainty and awareness. Descriptive statistics were used to summarize responses, and chi-square or Fisher's exact tests were applied to assess associations between demographic factors and career certainty.

Results: Of the 146 participants, only 32.9% reported being certain about their future career path at baseline. Awareness was high for postgraduate clinical tracks but substantially lower for public health, research, non-clinical specialties, and entrepreneurship. Parental employment status demonstrated a statistically significant association with baseline career certainty ($p < 0.001$), with higher certainty among students from salaried-employment households. No significant associations were observed for gender or rural–urban background. "Lack of information" was the most frequently reported barrier to achieving preferred career goals. Following the structured guidance session, 87.7% rated it as useful, 82.2% reported increased career certainty, and 84.2% reported discovering new career options.

Conclusion: First-year MBBS students demonstrated limited baseline career clarity and uneven awareness of career pathways, partly shaped by parental occupational context. A single structured guidance session embedded within the Foundation Course was perceived to address informational gaps and enhance short-term career certainty. Longitudinal studies are warranted to evaluate sustained impact and inform scalable early career-support interventions.

Keywords: *Career guidance; Career certainty; Medical undergraduates; Social Cognitive Career Theory; Professional identity formation.*

INTRODUCTION

Career choice and career certainty are central to medical students' professional development, influencing workforce distribution, the composition of doctors across specialties, and long-term satisfaction. Contemporary literature emphasizes that medical career intentions are dynamic rather than fixed, evolving in response to educational, personal, and contextual influences across the undergraduate years (1-3). At entry into medical school, many students hold broad aspirations – often limited to "becoming a specialist" - with limited understanding of the full spectrum of clinical, non-clinical, academic, and system-level roles available within medicine (1,2).

Theoretical frameworks such as Social Cognitive Career Theory (SCCT) and models of professional identity formation provide useful lenses for understanding early career uncertainty. SCCT proposes that career interests and choices emerge from the interplay of self-efficacy beliefs, outcome expectations, and personal goals, all of which are shaped by prior learning experiences and contextual supports or barriers (4). In parallel, professional identity formation frameworks conceptualize medical education as a socialization process through which students progressively internalize the norms, values, and roles of the medical profession (5). Early medical students may therefore experience ambivalence as they reconcile personal aspirations, family expectations, and limited exposure to the realities of medical practice.

Empirical studies from diverse settings have shown that biographical and social factors including gender, socioeconomic background, parental occupation, and academic achievement are associated with specialty preferences and career trajectories (6-9). In particular, students from more socioeconomically advantaged or professionally employed families often report greater access to information, role models, and structured guidance regarding career planning (6,8,10,11). At the same time, medical students frequently report gaps in awareness of research pathways, academic careers, and alternative roles in public health, administration, and entrepreneurship, with research-oriented careers particularly underrepresented in their preferences (7,12,13).

In India, recent reforms by the National Medical Commission (NMC) have formalized an early orientation to "Career pathways and opportunities for personal growth" within the Foundation Course (competency FC 1.6). This provides a structured curricular space to introduce theory-informed career guidance at the point of entry into MBBS. However, systematic evidence on baseline career awareness, the influence of family context, and the perceived impact of such interventions in Indian government medical colleges remains limited (14).

This study therefore sought to assess baseline levels of career awareness, perceived influences, and career certainty among first-year MBBS students during the Foundation Course, to examine associations between selected demographic characteristics and career certainty, and to evaluate the immediate perceived impact of a structured early career-guidance session. By situating the findings within the frameworks of SCCT and professional identity formation, we seek to inform the design of early, equitable, and theory-informed career support interventions for undergraduate medical students.

MATERIALS AND METHODS

Study Design and Setting:

A cross-sectional questionnaire-based study with an embedded immediate post-session feedback component was conducted among first-year MBBS students of the 2025–26 batch at Government Medical College, Mahabubnagar, Telangana, India. The study was implemented during the National Medical Commission (NMC) Foundation Course under competency FC 1.6, which emphasizes discussion of "Career pathways and opportunities for personal growth."

Participants:

All first–year MBBS students present during the foundation course were invited to participate. A total of 146 students consented and were included in the study.

Study Instrument:

A structured questionnaire was developed which included both closed- and open-ended questions on demographic details, parental occupation, awareness of various medical career options, factors influencing career choice, perceived barriers, and certainty regarding their career path. Items were rated using a 5-point Likert scale and multiple-choice responses. The questionnaire underwent a two-step validation process. First, content validity was established through review by senior faculty members with expertise in medical education. Second, a pilot study involving 10 students was conducted to assess clarity, comprehension and flow. Feedback from the pilot study was used to refine the questionnaire before the main study commenced. Formal psychometric validation was not undertaken, as the questionnaire was designed for exploratory and formative educational evaluation.

Intervention:

Following baseline data collection using the questionnaire, an interactive session on "Career Pathways and Opportunities for Personal Growth" was conducted. The session, lasting two hours, incorporated a multimedia presentation and

discussion covering postgraduate clinical and non-clinical specialties, opportunities in government and defence services, research and academic pathways, overseas licensing examinations (USMLE, PLAB, etc.), and alternative careers such as hospital administration, public health, clinical research, and entrepreneurship.

Post-session Feedback:
At the end of the session, participants provided post-session feedback using a structured feedback form designed to assess the perceived usefulness of the session, self-reported changes in career certainty, discovery of new career options, and anticipated influence on future career planning.

Data Analysis:
Data was entered in Microsoft Excel and analysed using the Statistical Package for the Social Sciences (SPSS) version 29. Descriptive statistics such as frequencies and percentages were used to summarize categorical variables, while mean and standard deviation were computed for continuous variables. Associations between categorical variables (e.g., gender, background, parental occupation, and career certainty) were examined using the chi-square test of independence or Fisher's exact test, as appropriate. A p-value of < 0.05 was considered statistically significant. Given the exploratory nature of the study, no adjustment for multiple comparisons was performed.

Ethical Considerations
This study was conducted as an educational evaluation during routine NMC Foundation Course academic activities. Participation was voluntary, and students were informed about the purpose of data collection. Responses were collected anonymously, and no personal identifiers were recorded. The activity did not involve any clinical intervention, change in assessment, or collection of sensitive personal information. As the activity constituted an educational evaluation embedded within routine academic practice and posed minimal risk to participants, the study protocol was reviewed at the institutional level and determined not to require formal Institutional Ethics Committee approval. Informed consent was obtained from all participants prior to data collection.

RESULTS
The mean age of participants was 18.36 ± 0.95 years (Range: 17–21 years). Most students were females (67.8%, n = 99) and from urban backgrounds (64.4%, n = 94). At baseline, 32.9% (n = 48) reported being certain about their future career path, whereas 67.1% (n = 98) were uncertain. Participant characteristics are summarised in **Table 1**.

Table 1. Participant Characteristics (N = 146)

Variable	Category	n(%)
Gender	Male	47 (32.2)
	Female	99 (67.8)
Background	Rural	52 (35.6)
	Urban	94 (64.4)

Association Between Demographic Characteristics and Career Certainty
Chi-square tests of independence showed no significant association between gender and career certainty (χ^2 (1, N = 146) = 0.01, p = 0.92), nor between rural–urban background and certainty (χ^2 (1, N = 146) = 0.28, p = 0.60).

In contrast, parental occupation demonstrated a statistically significant association with career certainty. Students whose mothers were in salaried employment reported significantly higher certainty compared with those whose mothers were not salaried (Fisher's exact test, p = 0.002). The most pronounced disparity was observed for paternal occupation, wherein 64.0% of students from salaried paternal backgrounds reported baseline career certainty, compared with only 4.1% (n = 3) among those from non-salaried backgrounds, a difference that remained statistically significant despite small subgroup sizes (Fisher's exact test, $p < 0.001$).

When evaluated jointly, students from households where both parents were in salaried employment reported substantially higher career certainty (66.7%) compared with those from households without salaried parental employment (21.8%), a difference that was statistically significant (χ^2 (1, N = 146) = 21.84, $p < 0.001$). These associations are summarized in Table 2.

Table 2. Association between demographic factors and career certainty among first-year MBBS students (n = 146)

Variable	Category	Uncertain n (%)	Certain n (%)	Test statistic	p-value
Gender	Male	32 (68.1)	15 (31.9)	$\chi^2 = 0.01$ (1)	0.92
	Female	66 (66.0)	34 (34.0)		
Background	Rural	36 (70.6)	15 (29.4)	$\chi^2 = 0.28$ (1)	0.60
	Urban	62 (65.3)	33 (34.7)		

Mother's occupation	Not salaried*	75 (75.0)	25 (25.0)	Fisher's exact	0.002
	Salaried employment	23 (47.9)	25 (52.1)		
Father's occupation	Not salaried*	71 (95.9)	3 (4.1)	Fisher's exact	<0.001
	Salaried employment	27 (36.0)	48 (64.0)		
Both parents in salaried employment	No	86 (78.2)	24 (21.8)	$\chi^2 = 21.84$ (1)	<0.001
	Yes	12 (33.3)	24 (66.7)		

*Values are presented as n (%).
*Career certainty was categorized as certain vs uncertain.
*Not salaried includes farming, homemaker, and business occupations.
*Fisher's exact test was applied where expected cell counts were <5.

Baseline Awareness of Career Pathways

Students exhibited the highest level of awareness of postgraduate clinical specialties (80.1%, n = 117), followed by general clinical practice (66.4%, n = 97). Awareness was comparatively lower for Armed Forces Medical Services (52.1%, n = 76), public health/government services (48.6%, n = 71), and academic medical careers (45.2%, n = 66). Awareness of non-clinical specialties, research opportunities, and entrepreneurship was substantially lower (15.8–20.5%). Detailed awareness patterns are provided in **Figure 1**.

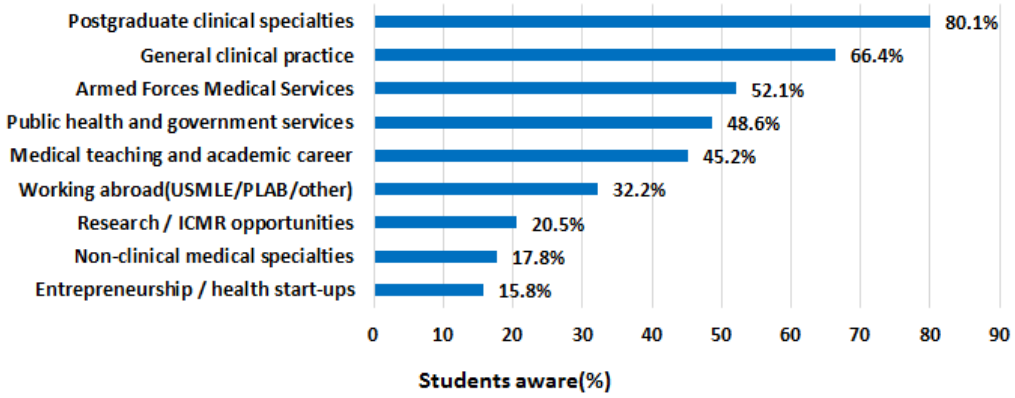

Figure 1. Baseline awareness of different career pathways among first-year medical students

**Multiple responses allowed*

Preferred Career Pathways

Postgraduate clinical specialties were the most preferred career path (76%, n = 111), followed by general clinical practice (9.6%, n = 14) and public health/government services (4.8%, n = 7). No student selected research as their first preference. Preferences are summarised in **Figure 2**.

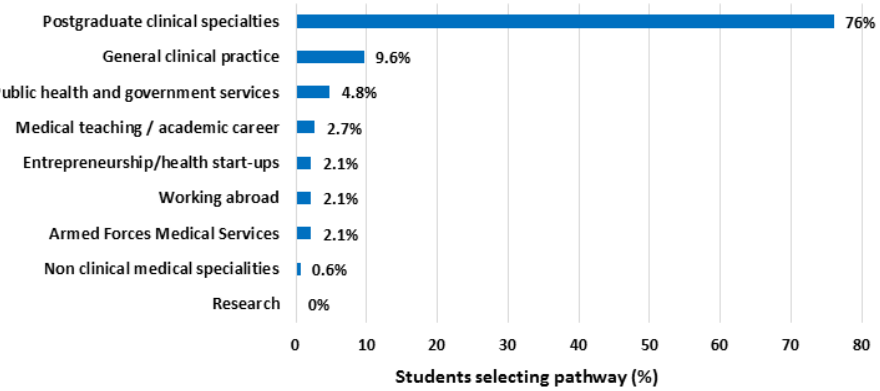

Figure 2. Preferred career pathways among first-year MBBS students

**Single best response*

Perceived Barriers to Achieving Preferred Career Goals

The most frequently reported barrier was lack of information (35.6%, n = 52), followed by limited postgraduate seats (27.4%, n = 40) and lack of guidance (24.7%, n = 36). Financial constraints and family pressure were less frequently reported. These findings are shown in **Figure 3**.

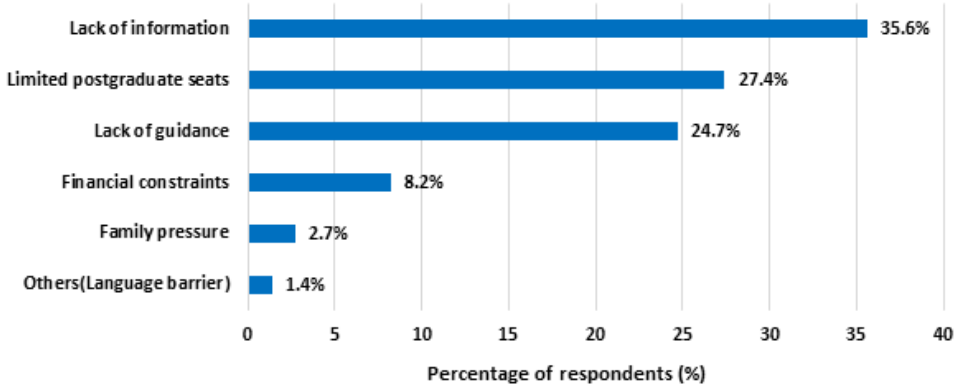

Figure 3. Perceived Barriers to achieving the preferred career pathway

**Single best response*

Perceived Impact of the Career-Guidance Session

Post-session feedback indicated positive perceptions. Most students (87.7%, n = 128) rated the session's usefulness as high (score 4 or 5) on a scale of 1 to 5. A majority (82.2%, n = 120) reported increased career certainty; 84.2% (n = 123) stated that they had discovered new career options; and 57.5% (n = 84) anticipated making changes to their career plans based on the session. These results are presented in **Table 3**.

Table 3. Post-Session Feedback (N = 146)

Feedback Indicator	Yes, n (%)
Session usefulness rated 4 or 5	128 (87.7)
Increase in career certainty	120 (82.2)
Discovered new career options	123 (84.2)
Will change career plan based on session	84 (57.5)

DISCUSSION

The present study examined career certainty, career awareness, and perceived barriers among first-year MBBS students at entry into medical school and evaluated the immediate impact of a structured career-guidance session delivered during the NMC Foundation Course. At baseline, only about one-third of students reported being certain about their future career path, despite a strong overall preference for postgraduate clinical specialties. This pattern is consistent with previous work demonstrating that medical students' career intentions are fluid, particularly in the early stages of training, and often evolve as students encounter new learning experiences and role models (1,2,3). Within the SCCT framework, such low early certainty may be interpreted as a consequence of incomplete information, limited mastery experiences, and ambiguous outcome expectations regarding the many possible medical career trajectories (4).

A notable finding is the strong association between parental employment status and baseline career certainty. Students from households where parents—particularly both parents—were in salaried employment demonstrated markedly higher career certainty compared with those from non-salaried backgrounds, including farming, homemaking, or informal business. While causality cannot be inferred from this cross-sectional design, these results align with literature indicating that socioeconomic stability, parental education, and structured professional environments are associated with clearer career aspirations and more confident decision-making among medical students (6-9,11,14). From an SCCT perspective, families engaged in formal salaried employment may offer richer career-related learning experiences, such as greater exposure to professional networks, clearer understanding of educational and career pathways, and stronger expectations around long-term planning (4,10). Conversely, students from non-salaried or informal-sector backgrounds may face greater informational and structural constraints, contributing to higher levels of uncertainty during early career decision-making (10,11). Rather than representing individual differences alone, these patterns suggest that contextual advantages linked to family employment may systematically shape early career confidence among medical entrants.

Taken together, these findings point to an early equity gap in medical education. While admission to medical school is often viewed as a social equalizer, the present data suggest that students do not begin training on an informationally level playing field. Within the SCCT framework, students from salaried or professional households may benefit from sustained

vicarious learning and social persuasion long before entry into medical school, effectively constituting a "hidden curriculum" that shapes professional expectations and confidence. In contrast, students from non-salaried or informal-sector backgrounds may enter medical school with comparable academic merit but substantially less access to career-related information, professional networks, and anticipatory guidance. This divergence in informational capital is evident from the first weeks of training and has implications for equity-oriented curriculum design.

In this cohort, there was no statistically significant association between gender or rural–urban background and career certainty. This contrasts with some studies that have reported gendered or geographic differences in specialty preferences and career plans (6,8,9,14). One possible explanation is that broader structural and informational factors, such as parental employment, access to coaching, and national examination pressures now exert a stronger influence than gender or geographic origin at the entry point into medical school. Alternatively, gender and rural–urban differences may emerge later, as students encounter clinical role models, lifestyle information, and social expectations in particular specialties (2,3,8). Longitudinal, multi-centre research will be necessary to clarify when and how these influences become salient.

The baseline data revealed a narrow awareness profile. Students were familiar primarily with postgraduate clinical specialties and general clinical practice, whereas awareness of non-clinical specialties, research careers, public health roles, and entrepreneurship was comparatively low. This mirrors findings from other settings in which early medical students primarily equate "being a doctor" with visible clinical work, with less recognition of academic, research, and system-level careers (1,7,9,13,14). The complete absence of research as a first-choice career in this cohort echoes previous reports of limited orientation toward research and academic medicine in undergraduate curricula, particularly in low- and middle-income contexts (7,12,13).

Within professional identity formation models, such narrow early awareness can constrain the "possible selves" that students envisage as future physicians (5). If students do not encounter role models in research, public health, or leadership positions, those roles may remain outside their imagined professional identity. The prominence of "lack of information" as the most frequently perceived barrier suggests that many students are acutely aware of gaps in their understanding of career pathways beyond clinical specialization. Their strong demand for postgraduate exam guidance, government service information, and interaction with senior doctors or alumni suggests that learners are actively seeking structured scaffolding to navigate these uncertainties.

The structured career-guidance session was perceived by students as helpful and associated with increased self-reported short-term career certainty and awareness. More than four-fifths reported discovering new career options. These findings suggest that even a single, well-designed intervention can address important informational gaps and catalyse reflection on career possibilities. In light of SCCT, the session can be viewed as providing structured information, vicarious experiences, and opportunities for cognitive reframing of career options (4). By explicitly mapping postgraduate clinical and non-clinical specialties, research and academic pathways, government and defence services, and opportunities abroad, the intervention may have enhanced students' self-efficacy for career planning and modified outcome expectations. Similar effects have been reported for formal career counselling, mentoring programs, and early exposure to specialty-specific experiences, which have been shown to reduce anxiety and support more informed, aligned career decisions (1,8,9,15).

The findings of this study have important implications for institutional policy and undergraduate curriculum design. The high baseline uncertainty observed among students from non-salaried backgrounds, together with the complete absence of interest in research careers, suggests that a single career-orientation session during the Foundation Course may be insufficient to ensure equitable career readiness. Medical colleges may benefit from adopting a longitudinal approach to career guidance, with repeated, developmentally appropriate touchpoints across the pre-clinical, para-clinical, and clinical phases of training. Targeted mentoring or faculty–alumni support mechanisms may be particularly valuable for students who are first-generation professionals and who lack access to informal career-related networks. In addition, deliberate visibility of non-clinical, academic, and research-oriented physician role models within early curricula may help broaden students' perceived "possible selves" during professional identity formation. At a systems level, strengthening institutional career guidance structures and exploring standardized approaches to evaluating career awareness across medical colleges could support the equity goals of the National Medical Commission.

However, these findings should be interpreted cautiously. The evaluation relied on immediate, self-reported perceptions of usefulness and certainty, which are susceptible to novelty and social desirability effects. There was no comparison group, and no longitudinal follow-up to determine whether the perceived gains in certainty are sustained or whether students later revise their choices as clinical exposure increases, as documented in longitudinal studies (2,3). Accordingly, the present findings are best understood as evidence that students perceive value in structured career guidance and that informational deficits may be modifiable in the short term, rather than as evidence of long-term or causal impact. From an educational perspective, these findings suggest that early career guidance may serve as an important informational and

reflective scaffold during students' transition into medical training. Embedding such sessions longitudinally, rather than as a single exposure, may better support informed career exploration and equitable access to career-related knowledge.

Strengths and Limitations

This study has several strengths. It captures students' career certainty and awareness at the point of entry into MBBS, a relatively under-explored stage in the Indian context. The study is embedded in the nationally mandated NMC Foundation Course (FC 1.6), enhancing curricular relevance and potential scalability. Use of a content-validated and pilot-tested questionnaire, along with high participation, strengthens the internal validity of the findings. Finally, the study adopts a multidimensional lens, examining demographic factors, parental occupation, awareness, influences, perceived barriers, and immediate responses to an intervention.

Nonetheless, few limitations must be acknowledged. As a single-centre study from one government medical college, generalizability to other institutional and socio-cultural contexts is limited. In addition, some subgroup analyses—particularly those related to parental occupation—included small cell sizes, resulting in wide and imprecise estimates; therefore, statistically significant associations should be interpreted cautiously and primarily as indicators of direction and magnitude rather than precise effect estimates. The measure of career certainty relied on self-report rather than a validated multi-item scale. The absence of a control group precludes causal inference regarding the effect of the intervention, and the lack of longitudinal follow-up cannot determine the durability of changes in certainty or awareness. Career certainty was assessed immediately after the intervention and may therefore reflect short-term perceptions rather than stable long-term career decisions. Finally, important potential confounders—including parental education, socioeconomic status, type of schooling, and prior exposure to career guidance—were not measured and should be incorporated into future research.

CONCLUSION

First-year MBBS students in this study entered medical school with considerable uncertainty about their long-term career pathways, particularly outside traditional clinical specialties. Parental occupational category, especially dual parental salaried employment was strongly associated with greater baseline career certainty, highlighting the role of family context and informational capital in shaping early career confidence. A structured career-guidance session embedded within the NMC Foundation Course was perceived as highly useful and was associated with increased perceived short-term clarity regarding career options and pathways. These findings reflect immediate post-intervention perceptions rather than stable career decisions and should not be interpreted as evidence of sustained change in career trajectories.

Grounded in SCCT and professional identity formation frameworks, these findings support the integration of early, theory-informed, and equity-focused career guidance into undergraduate medical curricula. Such interventions may help broaden students' career horizons, reduce informational barriers, particularly for those from non-salaried or less advantaged backgrounds and support more reflective, well-aligned professional trajectories. Future work should employ multi-centre, longitudinal designs and validated measures to examine how repeated, longitudinal career-support activities influence the evolving intentions and professional identities of medical students in India. Medical colleges should consider integrating multiple, spaced career-guidance touchpoints across the MBBS curriculum rather than relying solely on a single Foundation Course session.

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