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Attitude towards higher education and career choices of Siddha internship students: A cross-sectional study

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Abstract:

Graduation surveys are common in education but rarely used in Siddha, despite BSMS graduates being the foundational human resource of the system's future. In this cross-sectional survey, 205 CRRI students from eight institutions (2016–2022, pre-NCISM batch) were surveyed using a validated 31-item questionnaire and the data were analyzed using descriptive statistics, chi-square with Cramer's V and multinomial logistic regression. Most respondents were female (77%), 88% planned to continue in Siddha and 63% aimed for post-graduation, mainly for better institutional/clinical exposure and financial security. Students felt confident in counselling (91%) but not in Siddha diagnostic tools (17%) or radiological interpretation (12%) and their graduation plans were linked to gender, institution, expected degree, self-confidence, self-development and perceived clinical gaps. Limited opportunities, an outdated curriculum and a theory–practice gap emerged as major barriers, indicating the need for more PG seats, new specializations and curricular reform.

Keywords: Siddha medicine, career choices, higher education, graduation survey, internship, medical education, bachelor of siddha medicine and surgery (BSMS), cross-sectional study

Background:

The Siddha system of medicine is one of India's recognized indigenous systems and an integral component of the country's public health care framework [1]. Over the past few decades, its global footprint has expanded through initiatives such as the WHO Global Center for Traditional Medicine, WHO International Standard Terminologies for Siddha and national programmes integrating Siddha into wellness and geriatric care [2]. Graduation surveys are used internationally to analyze educational trajectories and employment outcomes and to inform education and workforce policy [3] and are increasingly recommended as instruments for quality assurance and curricular development in medical faculties [4]. For the Siddha system of medicine, such surveys are sporadic: an earlier questionnaire study of 65 Siddha undergraduates reported that about 63% aspired to post-graduate study in their core subject [5]. In the allied Ayurveda stream, a national survey of 1,022 undergraduates exposed serious gaps in clinical-skill training and urged stricter regulatory approaches [6] and cross-sectional studies of medical undergraduates show that identifying the factors behind career choices can strengthen curriculum planning [7]. Comparable AYUSH surveys have called for more post-graduate seats and for practice-oriented teaching with greater clinical exposure [8, 9]. In medical students, the choice and perception of community medicine across different aspects have suggested policy makers to contribute to the vitalization of the field as a coveted and attractive specialty [10]. Similarly, a KAP study among MBBS internship students about Siddha and integrative approach revealed higher mean scores in both attitude and perception indicating a shift towards a more integrative approach with a limited knowledge [11]. The Bachelor of Siddha Medicine and Surgery (BSMS) is a five-and-a-half-year programme that includes a one-year Compulsory Rotatory Residential Internship (CRRI) and is now governed by a competency-based curriculum under the National Commission for Indian System of Medicine (NCISM) [12]. The aspirations, confidence and perceived challenges of the outgoing interns

remain undocumented [5]. Therefore, it is of interest to assess the attitude of BSMS CRRI students towards higher education and career choices, testing whether graduation plans are associated with their social identity, academic background, institutional exposure, self-confidence, skills and career vision.

Methodology:**Study design, population and setting:**

This cross-sectional study used a self-structured, standardized questionnaire. The study population comprised all Siddha CRRI students from government and private institutions in the 2016–2022 academic blocks (386 students). The field survey covered eight Siddha institutions in Tamil Nadu and Kerala: Government Siddha Medical College (GSMC) Palayamkottai; GSMC Chennai; Akila Thiruvithamcore Siddha Vaidya Kalloory (ATSVS), Kanyakumari; Sri Sairam Siddha Medical College and Research Centre, Chennai; Velumailu Siddha Medical College, Kancheepuram; R.V.S. Siddha Medical College, Coimbatore; Sivaraj Siddha Medical College, Salem; and Santhigiri Siddha Medical College, Thiruvananthapuram (Kerala). Data were collected over four months (August–November 2022); analysis and reporting were completed in 2023.

Sampling:

Cluster random sampling was used and the target list was obtained from each institution and subjects were selected randomly. A total of 205 students (about 53.1% of the study population, 95% confidence level) were surveyed. Students of the 2016–2022 CRRI blocks in India were included; those unwilling to participate were excluded.

Questionnaire development and validation

The instrument was developed after five focus-group discussions (37 CRRI students from GSMC Chennai and GSMC Palayamkottai) and telephone interviews with five respondents from private institutions, following accepted guidance for questionnaire construction [13]. The final questionnaire

contained 10 demographic items and 31 main questions (27 closed multiple-choice, 2 closed multiple-response and 2 open-ended), preceded by a participant information sheet and informed-consent form. A pilot study on 20 CRRI students (July 14, 2022, GSMC Palayamkottai; completion time 20–30 minutes) established face and content validity and expert opinion was used to remodel or discard non-informative items.

Statistical analysis and ethics

Data were entered and analyzed using descriptive statistics and frequencies in SPSS v26.0. As the items were categorical, Pearson's chi-square test of association with Cramer's V was applied for construct validity and to test the study hypotheses [14]; associations with $p < 0.05$ were considered significant. An overall association was confirmed (Pearson $\chi^2 = 127.735$, $df = 36$, $p < 0.001$; Cramer's $V = 0.322$, $\Phi = 0.789$; $N = 205$). Multinomial logistic regression was additionally used to model graduation plans against demographic and attitudinal predictors. Institutional Ethics Committee approval was obtained (Ref. no. GSMS-IX IEC-Br-I/05/19.07.2022) and written informed consent was obtained from all participants.

Results:

Of the 205 respondents, 157 (77%) were female and 48 (23%) were male, reproducing the roughly 1:3 male-to-female ratio of Siddha undergraduates; 194 (95%) were unmarried. The mean age was 23.8 years (range 22–36), with 67.8% aged 23. About 42% studied at Government institutions, GSMC Palayamkottai (22%) and GSMC Chennai (20%) contributing the largest shares. Socioeconomically, both parents were employed for 29% of students, either parent held a degree for 51% and 31% were first-generation graduates; 21% had a doctor in the family. The commonest paternal occupation was Government service (33%) and 53% of families reported a monthly income below ₹40,000. The demographic and socioeconomic profile is summarized in **Figure 1** and **Table 1**. Although 48% had joined BSMS because they could not enter MBBS, 88% intended to work or pursue higher education within Siddha. For immediate plans, 49% intended to prepare for both AIAPGET and MRB examinations, 14% for AIAPGET with higher education in Siddha, 12% for private practice and 12% for MRB alone. Overall, 63% aspired to post-graduation most often to gain institutional and clinical experience (33%) or for stipend and a secure environment (31%) and 64% expected a Master's degree as their highest qualification. External therapy/*Sirappu Maruthuvam* (22%) and General Medicine (21%) were the most desired departments and the National Institute of Siddha (38%) the most preferred institute. If not selected for PG/MRB, 55% would take up private practice. These attitudes are shown in **Figure 2**, with item-wise frequencies in **Table 2**. Confidence was domain-dependent. For interpersonal tasks, 91% felt able to counsel patients and 86% to give precise diet and medical advice. However, for technical tasks, it was low; only 17% were confident using Siddha diagnostic tools (Naadi-Pulse examination/*Envagai theruvu*-Eight-

fold examination), 12% felt skilled in interpreting radiological reports and 78% felt they needed more experience to handle patients. Accordingly, 89% would use both Siddha and modern diagnostic tools in practice. Overall academic satisfaction was neutral for 46% of students and 53% felt they had not been given equal opportunity to learn exclusive Siddha features; 83% had never attended a career-choices workshop. Pharmacology (41.8%) led the areas of interest and only 4% were both interested in and aware of formal research pathways. For their five-year vision, 32% saw themselves as Government doctors, 26% as private practitioners and 26% in higher education (**Figure 3**, **Table 2**). Pearson's chi-square tests showed that graduation plan and related attitudes were significantly associated with several factors (**Table 3**). Five-year vision differed by gender: 22 of 48 male students ($\approx 48\%$) envisioned private practice against 31 of 157 female students ($\approx 20\%$), whereas Government doctor (34%) and higher education (30%) dominated among women ($\chi^2(6) = 26.79$, $p < 0.001$; **Table 4**). HSE score was associated with the reason for joining BSMS ($\chi^2(12) = 35.54$, $p < 0.001$): about 73% of those who joined because they could not enter MBBS were high scorers (90–≥95%). Immediate plans were associated with counselling and diet-advice confidence, attitude to working in allopathic hospitals and willingness to change career and with expected degree, reasons for joining PG, academic satisfaction, awareness of other higher-education choices and five-year vision (all $p < 0.05$). Expected highest degree was associated with PG department, institute and backup-plan choices; academic satisfaction with confidence and skills; backup plans with five-year vision; and confidence in Siddha diagnostic tools with the tools chosen for diagnosis. Multinomial logistic regression confirmed that graduation plan was significantly predicted by gender, institution, expected highest degree, self-confidence, self-development, counselling ability and perceived clinical shortcomings (all $p < 0.001$; **Table 5**). The open-ended responses (≈ 250) resolved into six themes: limited opportunities (Siddha not being mainstream medicine); clinical-practice concerns (financial stability, cost of medicines, drug adulteration, absence of standard operating procedures, handling emergencies); social pressure (public unawareness of the BSMS curriculum, competition with allopathic doctors, marriage-related constraints); academic shortcomings (poor infrastructure, out dated syllabus, theory-practice gap, few PG seats, lack of career guidance); self-esteem and mental health (lack of self-confidence reported by more than half); and restricted opportunities for Siddha outside Tamil Nadu. Suggested improvements (≈ 103 responses) included more rural and public-health postings, placements in multispecialty and integrated-care settings, legalized overseas practice, training in psychology and counselling, start-up loans and introduction of new PG specializations such as Siddha psychology, dermatology, ophthalmology and gynecology. Summary of the findings are documented below in **Figure 4**.

Table 1: Demographic and socioeconomic characteristics of respondents (n = 205)

Characteristic	Category	n (%)
Gender	Female	157 (77)
	Male	48 (23)
Marital status	Unmarried	194 (95)
	Married	11 (5)
Age (years)	Mean 23.8 (range 22–36); 23 years	139 (67.8)
Monthly household income (₹)	<20,000	44 (22)
	20,000–39,999	63 (31)
	40,000–59,999	42 (21)
	60,000–79,999	29 (14)
	≥80,000	27 (13)
Father/guardian occupation	Government	68 (33)
	Business	52 (25)
	Farmer	46 (22)
	Private sector	27 (13)
	Labour	12 (6)
Both parents employed	Yes	60 (29)
Either parent a graduate	Yes	104 (51)
First-generation graduate	Yes	63 (31)
Doctor in the family	Yes	43 (21)

Table 2: Item-wise responses on attitude, knowledge, confidence and skills (n = 205; values are % (n); multiple-response items marked †)

Survey item	Response categories – % (n)
HSE (12th) score	90–95%: 51 (105); 80–89%: 25 (51); 70–79%: 10 (21); >95%: 10 (20); <70%: 4 (8)
Reason for joining BSMS	Could not get MBBS: 48 (98); family/friends suggested: 37 (75); own interest: 11 (22); BSMS/RIMP doctor recommended: 5 (10)
Plan after graduation	Both AIAPGET & MRB: 49 (100); AIAPGET + higher education: 14 (28); MRB only: 12 (25); private practice: 12 (24); competitive exams: 8 (17); higher education (other): 4 (9); raise a family: 1 (2)
Highest degree expected	Master's: 64 (132); Doctorate: 19 (39); Bachelor's: 17 (34)
When to start PG preparation	After 6 months of CRR: 31 (64); after internship: 28 (58); 3–6 months after joining: 16 (32); not sure: 16 (25); first 3 months: 9 (18)
Reason for joining PG	Institutional & clinical experience: 33 (67); stipend & secure environment: 31 (64); not interested in MD(S): 17 (34); specialisation in core: 16 (33); research & dissertation: 3 (7)
Preferred PG department	External/SPM: 22 (46); General Medicine: 21 (41); not interested: 16 (33); no particular dept.: 13 (24); Varma: 12 (22); Gunapaadam: 6 (13); Kuzhanthai: 4 (9); Yoga: 3 (5); Noinaadal: 2 (7); Nanju: 1 (5)
Preferred PG institute	NIS: 38 (79); GSMC Chennai: 19 (38); no particular college: 16; not interested: 16; GSMC Palayamkottai: 11 (22)
Backup plan if not PG/MRB	Private practice: 55 (112); other (non-MD) courses: 14 (27); prepare another year: 11 (24); not interested in PG: 10; no backup: 8 (17); raise a family: 2 (4)
Satisfaction with UG experience	Neither: 46 (94); satisfied: 35 (71); dissatisfied: 11 (22); very satisfied: 6 (12); very dissatisfied: 3 (6)
Confidence: Siddha diagnostic tools	Lack confidence, use as secondary: 43 (88); subjective/not confident: 18 (37); confident: 17 (34); not sure: 12 (25); do not use: 10 (21)
Skilled in radiological interpretation	Only a little: 60 (124); not sure: 27 (56); yes: 12 (25)
Diagnostic tools used in practice	Both Siddha & modern: 89 (182); modern only: 8 (17); Siddha only: 3 (6)
Treatment modalities learned	All three: 53 (109); Varma: 15 (30); massage: 13 (26); external therapy: 12 (24); none: 8 (16)
Equal opportunity to learn Siddha features	No: 53 (108); Yes: 47 (97)
Attended a career-choices workshop	No: 83 (170); Yes: 17 (35)
Confidence in handling patients	Need more experience: 78 (160); confident: 18 (37); not confident: 4 (8)
Can counsel patients / give diet advice	Counsel – Yes: 91 (186); diet & medical advice – Yes: 86 (176)
Areas of interest †	Pharmacology: 41.8 (105); pathology: 20.7 (52); medicinal botany: 17.5 (44); philosophy: 8.8 (22); research methodology: 6.8 (17); others: 4.4 (11)
Interest in research methodology	Interested but no idea: 42 (86); not interested: 43 (88); do not understand RM: 11 (22); interested & aware: 4 (9)
Awareness of other higher-education choices	No idea: 41 (85); aware & plan masters: 26 (53); aware but not interested: 15 (31); no BSMS eligibility: 7 (15); no scope seen: 10 (21)

Fields with scope/career opportunity †	Not sure: 27.4 (63); herbal cultivation & export: 25.2 (58); manufacturing unit: 17.4 (40); pharmacology: 17.4 (40); transcription & coding: 7 (16); biotechnology: 5.7 (13)
No opportunity other than PG/MRB	Yes: 57 (117); No: 43 (88)
Would work in an allopathy hospital	To gain knowledge: 58 (120); would not work: 37 (76); for higher pay: 4 (9)
Internship improved clinical knowledge	Yes: 64 (132); No: 36 (78)
Perceived area of weakness	All of the above: 44 (91); diagnosis of disease: 30 (61); line of treatment: 19 (39); handling patients: 7 (14)
Would change career now if possible	No: 62 (127); Yes: 38 (78)
Self-image in 5 years	Government doctor: 32 (86); private practitioner: 26 (53); higher education: 26 (53); other fields: 7 (14); start-up/business: 5 (10); civil servant/others: 2 (5); research: 2 (4)

Table 3: Chi-square tests of association for the study hypotheses (N = 205). HS, highly significant; S, significant

Variable 1	Variable 2	χ^2 (df)	p	Sig.
Gender	5-year vision	26.79 (6)	<0.001	HS
Economic status	Reason for joining PG	25.70 (16)	0.05	S
HSE (12th) score	Reason for joining BSMS	35.54 (12)	<0.001	HS
Plan after graduation	Can counsel patients	25.18 (6)	<0.001	HS
Plan after graduation	Give diet/medical advice	12.89 (6)	0.04	S
Plan after graduation	Work in allopathy hospital	21.73 (12)	0.04	S
Plan after graduation	Change career now	34.68 (6)	<0.001	HS
Plan after graduation	Highest degree expected	47.47 (12)	<0.001	HS
Plan after graduation	Reason for joining PG	87.11 (24)	<0.001	HS
Plan after graduation	Academic satisfaction	36.61 (24)	0.04	S
Plan after graduation	Awareness of higher education	42.44 (24)	0.01	HS
Plan after graduation	5-year vision	127.73 (36)	<0.001	HS
Highest degree expected	Reason for joining PG	83.32 (8)	<0.001	HS
Highest degree expected	Preferred department	76.19 (18)	<0.001	HS
Highest degree expected	Preferred institute	67.89 (8)	<0.001	HS
Highest degree expected	Backup plans	48.97 (10)	<0.001	HS
Academic satisfaction	Confidence: Siddha tools	28.23 (16)	0.03	S
Academic satisfaction	Radiological skill	41.00 (8)	<0.001	HS
Academic satisfaction	Equal learning opportunity	22.62 (4)	<0.001	HS
Academic satisfaction	Confidence handling patients	5.41 (4)	0.01	HS
Academic satisfaction	Give diet/medical advice	28.27 (4)	<0.001	HS
Backup plans	5-year vision	81.09 (30)	<0.001	HS
Confidence: Siddha tools	Diagnostic tools chosen	34.64 (8)	<0.001	HS

Table 4: Cross-tabulation of sex and five-year vision (n = 205).

Sex	Private pract.	Govt. doctor	Research	Other fields	Higher education	Start-up/ business	Others	Total
Male	22	12	1	0	6	6	1	48
Female	31	54	3	14	47	4	4	157
Total	53	66	4	14	53	10	5	205

Table 5: Multinomial logistic regression – likelihood-ratio tests for graduation plan (dependent variable: plan after graduation; N = 205)

Predictor	-2 log likelihood (reduced)	χ^2	df	Sig.
Gender	358.672	50.914	6	<0.001
Institute	394.724	86.966	42	<0.001
Highest degree expected	378.500	70.742	12	<0.001
Self-confidence (Siddha tools)	374.465	66.707	24	<0.001
Self-development (modalities learned)	367.273	59.515	24	<0.001
Can counsel patients	355.621	47.862	6	<0.001
Perceived area of weakness	357.917	50.159	18	<0.001

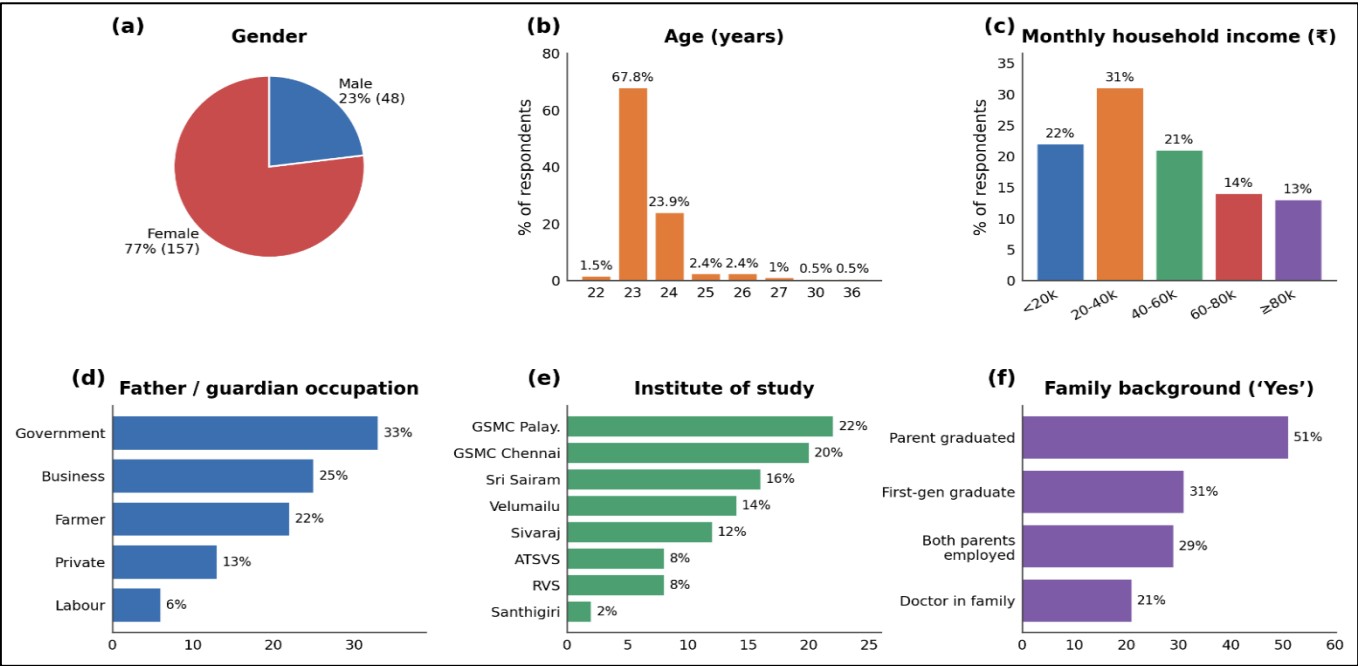


Figure 1: Demographic and socioeconomic profile of the Siddha CRRI respondents (n = 205): (a) gender, (b) age distribution, (c) monthly household income, (d) father/guardian occupation, (e) institute of study and (f) family academic and employment background

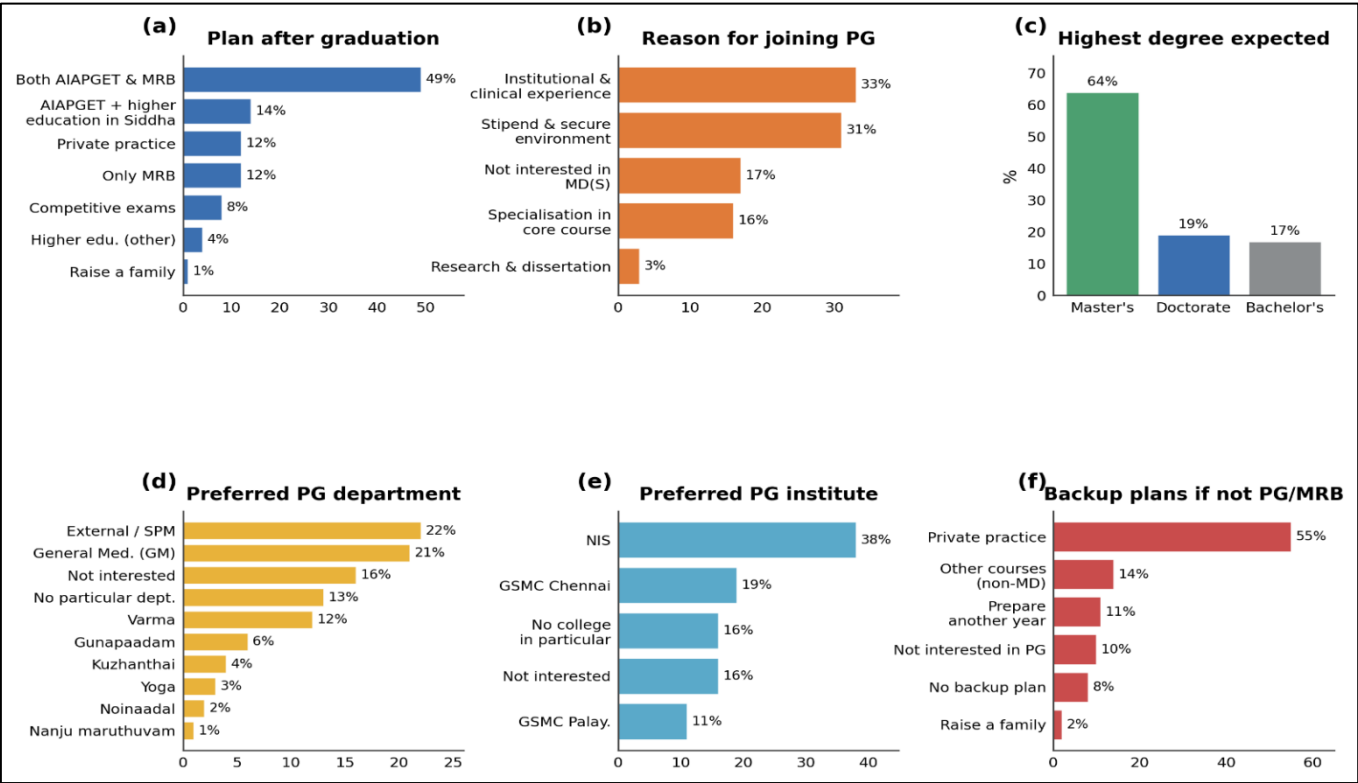


Figure 2: Attitudes towards higher education and career choices (n = 205): (a) immediate plan after graduation, (b) reasons for joining post-graduation, (c) expected highest degree, (d) preferred post-graduate department, (e) preferred post-graduate institute and (f) backup plans if not selected for PG/MRB

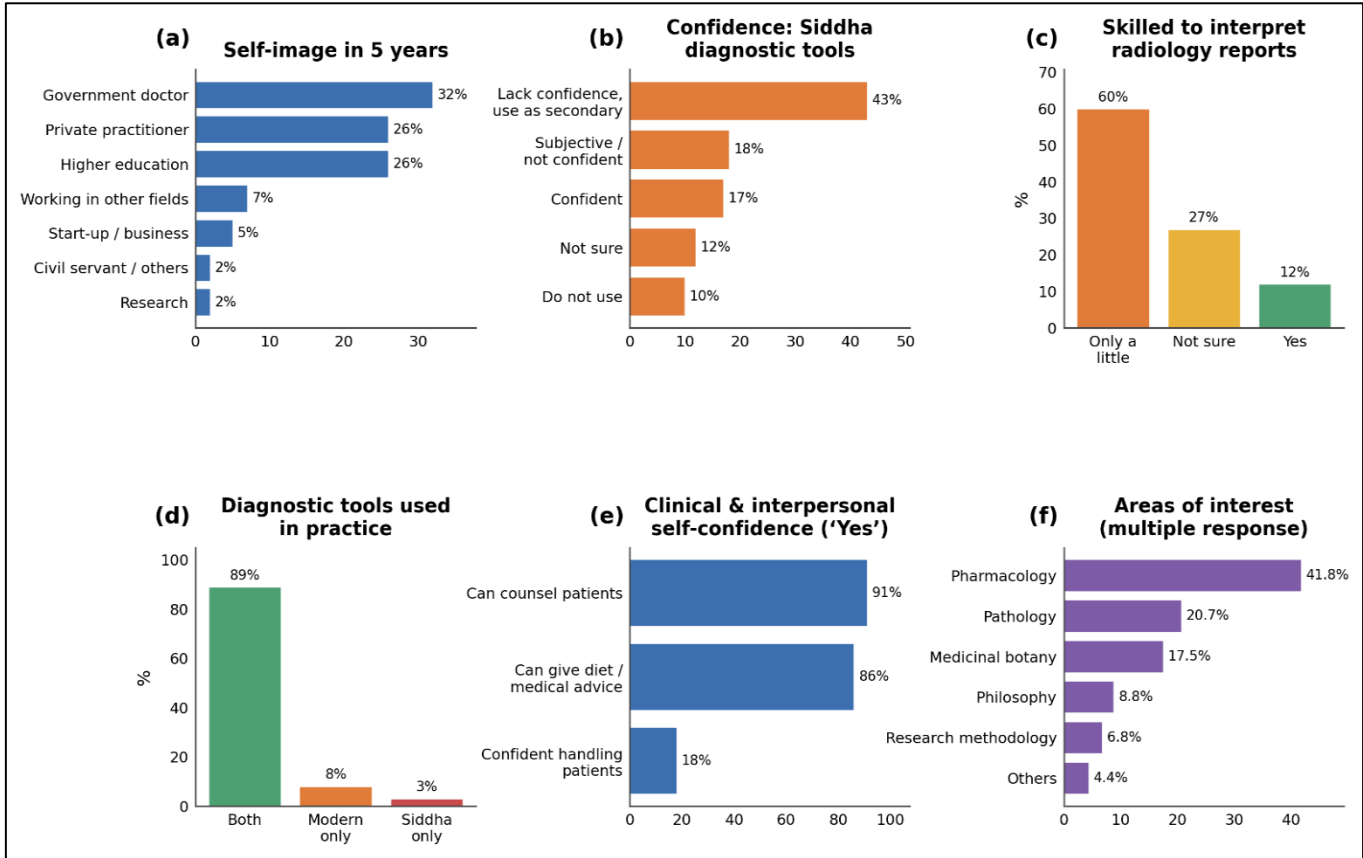


Figure 3: Self-perceived confidence, clinical skills and areas of interest (n = 205): (a) self-image in five years, (b) confidence in using Siddha diagnostic tools, (c) skill in interpreting radiological reports, (d) diagnostic tools chosen in practice, (e) clinical and interpersonal self-confidence and (f) areas of interest (multiple-response item)

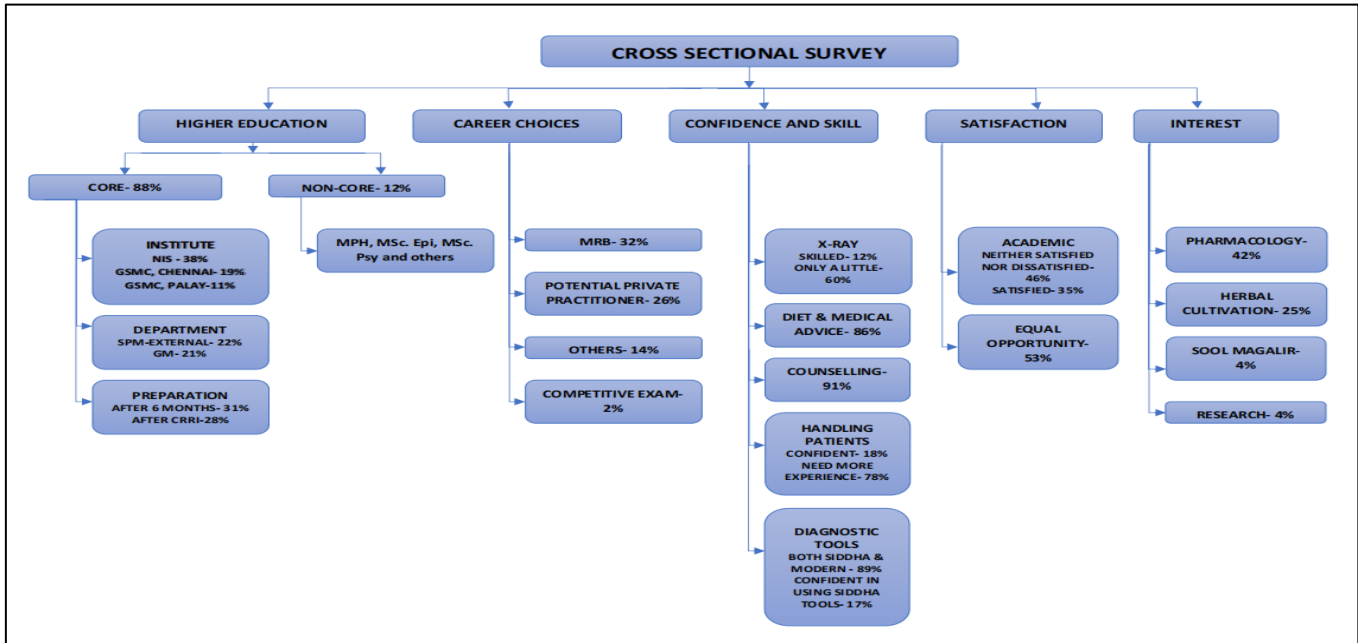


Figure 4: Summary of cross-sectional survey findings

Discussion:

The first ten demographic questions captured students' social identity, socioeconomic status and financial burden, which shaped their decisions. The gender distribution mirrors the real male-to-female ratio among Siddha undergraduates (approximately 1:3) and 42% of respondents were from Government institutions; thus, the choices observed were, to some extent, colored by the type of institution and the exposure students had during under-graduation. Although most top HSE scorers joined BSMS because they could not enter MBBS, 88% nonetheless plan to work or pursue higher education in their core system; most intend to sit the Siddha entrance examinations (AIAPGET/MRB) and the few who move to non-core or civil-service paths cite personal interest, lack of confidence, or lack of opportunity. This pattern of academically strong entrants converging on core-discipline careers echoes findings that career choices are shaped by identity and self-efficacy beliefs [15] and by a mix of personal and structural factors documented in undergraduate medical cohorts [16, 17]. Attitudes towards higher education (Q4–Q10) show that while most students aspire to post-graduation for institutional expertise (33%), nearly as many do so for stipend and a secure environment – a choice driven by socioeconomic status rather than a lack of ambition. Among existing PG departments, external therapy/*Sirappu Maruthuvam*, General Medicine and *Varma Maruthuvam* are the most desirable. The inclination of a large majority (63%) towards PG argues for an increase in PG seats and the strong interest in emerging areas – Siddha psychology, dermatology, ophthalmology, gynecology and emergency medicine – calls for new specializations that could widen the scope of the system, consistent with AYUSH surveys that link greater PG capacity to graduate satisfaction [8, 9]. Questions Q11–Q19 gauge academic satisfaction, confidence and skills. Most students are neither satisfied nor dissatisfied with the academic environment (46%) and the shortcomings they list–outdated syllabus and a gap between theoretical/textual knowledge and clinical practice–need authoritative action; the 35% who are academically satisfied are mostly confident and skilled. While responses on confidence in handling patients, using Siddha diagnostic tools and interpreting radiology are largely neutral, interpersonal skills such as counselling and diet/medical advice attract 80–90% confidence. This mismatch may partly explain the low number of prospective private practitioners and deserves dedicated study. More than half the students have learned all the exclusive Siddha treatment modalities, reflecting genuine enthusiasm for the system. Q21–Q23 reveals that most students are unaware of the scope and opportunities outside the core; sensitizing them to these is vital. Q24–Q25 show that, despite citing a lack of opportunities, many students would decline to work in an allopathic hospital and would not do so merely for higher pay. Q26 indicates that the internship year substantially strengthened clinical knowledge and Q27 shows that students recognize their own gaps and are eager to grow. Although most male students plan PG/MRB immediately after graduation, their vision of becoming private practitioners is higher than that of women; most female students aspire to become Government doctors or pursue higher education, plausibly reflecting societal

expectations of security and financial independence. Comparable gendered and structural patterns in post-graduation plans have been reported in nursing and medical cohorts [18, 19]. The two final open questions spell out the state of a Siddha undergraduate and the mandatory needs of the students and the system. The respondents were trained under the Modified Syllabus of Education (MSE-2016) that preceded the current reform. Since this survey, the National Commission for Indian System of Medicine (NCISM), constituted under the NCISM Act 2020, has introduced a comprehensively revamped, competency- and outcome-based BSMS curriculum, implemented for the First Professional batch from the 2024–25 academic years [12]. The new framework defines Programme Outcomes and Graduate Attributes that explicitly require the Siddha graduate to be a competent communicator and counsellor, a lifelong learner and a professional with the qualities of a researcher, academician and entrepreneur and it integrates modern medical sciences, formal research methodology and student-centred, experiential pedagogy with continuous internal assessment [20]. This does not diminish the validity of the present findings, which remain an accurate cross-sectional record of the pre-reform cohort surveyed in 2022 and reported in 2023; rather, it enhances their value. Several gaps documented were limited research awareness, the demand for structured career guidance, entrepreneurial aspiration and the perceived theory–practice gap, which are precisely the domains the new curriculum seeks to address; thus, the reform independently corroborates the study's conclusions. Equally important, these data now constitute a documented baseline against which the impact of the competency-based curriculum on student attitudes and career choices can be evaluated in future. Because the questionnaire was developed through focus-group discussions and expert interviews, refined by a pilot study for face and content validity and confirmed by construct validity (Pearson's chi-square with Cramer's V), it constitutes a standardized, reusable instrument rather than a single-use tool. It can therefore be applied without redevelopment to future cohorts, including students trained under the new NCISM curriculum and to other Siddha institutions, enabling direct, methodologically consistent pre-versus post-reform and multi-center comparisons.

Conclusion:

Most Siddha CRRRI students (63%) preferred postgraduate studies in Siddha and aspired to government service, perceiving private practice as challenging. Career preferences were significantly associated with gender, institution type, self-confidence, communication skills and self-perceived clinical competency gaps. Strengthening hands-on, practice-oriented training under the NCISM's CBDC merits consideration and repeating this validated survey in CBDC cohorts would enable direct comparative evaluation.

Limitations:

As the study involved a relatively homogeneous population surveyed at a single time point, the range of opinions may be

narrower than in the wider student body and generalization should be cautious, as the cohort predates the 2024 NCISM curriculum reform, the findings should be read as evidence for the pre-reform student population. A longitudinal survey spanning first to final year and a prospective follow-up of graduates after five years would better capture the evolving pulse of students and clarify where Government intervention is required.

Ethical approval:

This study was approved by the Institutional Ethics Committee (Ref. no. GSMS-IX IEC-Br-I/05/19.07.2022). Written informed consent was obtained from all participants.

Conflict of interest: The authors declare no competing interests.

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