

From Classroom to Career: Mapping the Pathways and Predictors of Nepali Pharmacy Students

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Abstract

Background.

The pharmacist's role has shifted from product-centred dispensing toward patient-centred pharmaceutical care, yet little is known about how Nepali Bachelor of Pharmacy (B.Pharm) students understand career options, choose the profession, or plan postgraduate study. Empirical work from neighbouring South Asian countries documents salary- and security-driven motivations and limited awareness of non-traditional roles; comparable, statistically analysed evidence from Nepal is scarce.

Objectives.

To describe career awareness, motivations, and immediate and long-term preferences among B.Pharm students in Nepal, and to identify demographic and attitudinal predictors of intention to pursue postgraduate education.

Methods.

Exploratory cross-sectional online survey of 102 undergraduate pharmacy students from public and private universities. Analyses in Stata/IC 17.0 comprised descriptive statistics, χ^2 tests of independence, Mann–Whitney U and Kruskal–Wallis tests, and binary logistic regression (outcome: planned postgraduate study). Effect sizes (Cramér's V, Nagelkerke R^2) accompanied p-values. Implied consent was obtained via anonymous questionnaire completion.

Results.

Respondents were predominantly female (59.8%) and aged 20–22 years (76.5%). Family was the leading source of career information (83.3%). High salary (mean 4.52/5) and job security (4.38/5) outranked intellectual interest (3.41/5). Only 40.2% were aware of career paths beyond community or hospital pharmacy. Immediate preferences clustered in community (38.2%) and hospital (31.4%) pharmacy; 73.5% planned postgraduate study, most often clinical pharmacy (35.3%). In the final logistic model (Nagelkerke $R^2 = 0.214$), male sex (OR 3.51, 95% CI 1.12–10.97), higher salary importance (OR 1.82, 95% CI 1.24–2.68), and awareness of alternative careers (OR 0.38, 95% CI 0.16–0.88) predicted postgraduate intention. Institution affiliation was associated with immediate career path ($\chi^2 = 12.45$, $df = 3$, $p < 0.05$).

Conclusions.

Nepali pharmacy students combine altruistic ideals with economic pragmatism, remain concentrated in traditional practice settings, and show a marked gender gap in postgraduate ambition. Curriculum

diversification, structured career counselling, and equity-focused support for female students are warranted. Findings are a baseline from a modest convenience sample and should be confirmed in a nationally representative, preferably longitudinal, study.

Trial registration

Not applicable (observational survey).

HIGHLIGHTS

- First systematic, statistically analysed snapshot of career awareness and preferences among Nepali B.Pharm students (n = 102).
- Family networks dominate career information; salary and job security outrank intellectual interest as motivators.
- Nearly 60% of students are unaware of careers beyond community or hospital pharmacy.
- 73.5% intend postgraduate study; male students have 3.5-fold higher odds of this intention.
- Awareness of alternative careers is associated with lower, not higher, odds of planning a master's degree.

1. INTRODUCTION

The pharmacist's professional identity has been rewritten over the past three decades. Pharmaceutical care, as articulated by Hepler and Strand, recast the pharmacist from a dispenser of commodities to a practitioner accountable for medication-related outcomes and quality of life.¹ Subsequent reviews document expansion into chronic-disease management, medication therapy management, immunisation, and public-health programmes, supported by collaborative practice models and digital health tools.^{2–4} Workforce planning therefore depends not only on graduate numbers but on what those graduates know about the labour market, why they entered the profession, and where they intend to practise.^{5,6}

South Asia has seen rapid proliferation of pharmacy programmes in India, Bangladesh, Pakistan, and, more recently, Nepal.^{7,8} Studies from the region consistently find that salary potential, job security, and social status compete with—and often overshadow—altruistic motives such as helping patients.^{9–13} Family recommendation is a dominant enrolment driver.^{11,14} Students frequently lack awareness of roles in clinical research, regulatory affairs, academia, pharmacovigilance, and industrial science, producing a mismatch between graduate skills and market demand and a risk of underemployment.^{15–17} Urban preference and reluctance to practise in rural, underserved areas are also recurrent.^{18,19}

Nepal is at a pivotal stage of health-system and pharmaceutical-industry development. The Drug Act 2035 (1978) and the Department of Drug Administration (DDA) regulate manufacture, distribution, and pharmacy practice; the Nepal Pharmacy Council Act 2057 (2000) governs education and licensure; and the National Drug Policy 2052 (1995) frames rational use and domestic production.^{20,21} Bachelor of Pharmacy (B.Pharm) programmes—typically four years—are now offered under Tribhuvan University, Kathmandu University, Pokhara University, Purbanchal University, and selected academies of health sciences, substantially enlarging the graduate pipeline.^{8,22} Whether these graduates will staff rural pharmacies, enter industry and regulation, or pursue advanced clinical training will shape Nepal's medicines workforce. Prior Nepali work has examined attitudes toward pharmaceutical care among undergraduates,²³ but career awareness, ranked motivations, and statistically modelled predictors of postgraduate intention have not been reported in a systematic way. Family influence, perceived economic return, and social status are known to structure educational choice in Nepal more generally,²⁴ yet their relative weight among pharmacy students remains unquantified.

This study addresses that gap. We report an exploratory, multi-institution cross-sectional survey of B.Pharm students that (i) profiles sources of career information and motivations; (ii) maps awareness of alternative pathways and immediate career preferences; and (iii) identifies demographic and attitudinal predictors of planned postgraduate study using binary logistic regression. The results are intended as a baseline for educators, the Nepal Pharmacy Council, DDA, and employers seeking to align pharmacy education with national health-workforce needs.

2. METHODS

2.1 Study design and ethical considerations

We used a cross-sectional survey framed as an exploratory pilot because of the moderate sample ($n = 102$) and non-probability recruitment. The design is appropriate for hypothesis generation, theme identification, and a first quantitative baseline, while acknowledging limited statistical power and generalizability. The study was conducted in accordance with the Declaration of Helsinki. As this research involved an anonymous, minimal-risk educational survey collecting no personally identifiable health data, formal ethics committee approval was deemed unnecessary in accordance with the national guidelines of the Nepal Health Research Council (NHRC) for minimal-risk observational studies. Participation was anonymous and voluntary, and completion of the questionnaire constituted implied informed consent.

2.2 Setting, population, and sampling

The target population was undergraduate students enrolled in B.Pharm programmes at public and private universities in Nepal. The sampling frame included major universities offering pharmacy education. An online questionnaire was distributed through institutional contacts and student networks

(convenience/snowball sampling). Eligible respondents were currently enrolled B.Pharm students of any year of study who provided implied consent. No incentive was offered.

2.3 Instrument

The questionnaire was adapted, with explicit written permission from the original corresponding author (Dr. L.A. Hanna), from the validated instrument previously published by Hanna et al. (2016) [11], and tailored to the Nepali educational context. The adapted tool comprised: (a) demographics (gender, age band, province of origin, institution affiliation, year of study); (b) sources of initial career information (multiple response); (c) motivations for choosing pharmacy (multiple response and five-point Likert items, 1 = strongly disagree to 5 = strongly agree) covering salary, job security, work–life balance/flexible hours, social status, helping others, and intellectual interest; (d) awareness of alternative career paths (yes/no, with free-text/listed options: clinical research, regulatory affairs, industry, academia, and others); and (e) preferred immediate post-graduation pathway and intention to pursue postgraduate study (yes/no) with preferred field. An English-language version of the adapted questionnaire is provided as Supplementary File 1.

2.4 Statistical analysis

Analyses were performed in Stata/IC 17.0 (StataCorp, College Station, TX, USA). Categorical variables are reported as frequencies and percentages; Likert items as means and standard deviations. χ^2 tests of independence examined associations between categorical predictors (gender, institution, province) and outcomes (preferred career path, postgraduate intention). Binary logistic regression modelled planned postgraduate study (yes/no). Candidate predictors included gender, institution, province, year of study, and attitudinal Likert scores; the final parsimonious model retained gender, importance of salary, and awareness of alternative careers. Odds ratios (ORs) with 95% confidence intervals (CIs) are reported. Likert data that violated normality were compared with the Mann–Whitney U test (two groups) or Kruskal–Wallis H test (≥ 3 groups). Effect sizes included Cramér's V for χ^2 tests and Nagelkerke R^2 for logistic regression. Two-sided $p < 0.05$ was considered statistically significant. Missing data were handled by available-case analysis; item-level missingness was negligible.

2.5 Reporting

The manuscript follows STROBE guidance for cross-sectional studies.²⁶ A completed STROBE checklist should accompany journal submission.

3. RESULTS

3.1 Descriptive profile of respondents

One hundred and two B.Pharm students completed the survey. Females comprised 59.8% ($n = 61$) and males 40.2% ($n = 41$). Most were aged 20–22 years (76.5%); 20.6% were 23–25 years and 2.9% were ≥ 26 years. Students originated from all seven provinces (Table 1), indicating geographic spread, although

several campuses remain concentrated in more accessible regions. Institution affiliation was Tribhuvan University 38.2%, Pokhara University 18.6%, Kathmandu University 16.7%, and other universities 26.5%. Year of study was relatively even: first 23.5%, second 21.6%, third 28.4%, and fourth 26.5% (Table 1).

Table 1
Demographic and academic profile of respondents (n = 102)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	41	40.2
	Female	61	59.8
Age	20–22 years	78	76.5
	23–25 years	21	20.6
	≥ 26 years	3	2.9
Province of origin	Koshi (Province 1)	20	19.6
	Madhesh (Province 2)	18	17.6
	Bagmati (Province 3)	14	13.7
	Gandaki (Province 4)	13	12.7
	Lumbini (Province 5)	12	11.8
	Karnali (Province 6)	10	9.8
	Sudurpashchim (Province 7)	15	14.7
Institution affiliation	Tribhuvan University (TU)	39	38.2
	Pokhara University (PU)	19	18.6
	Kathmandu University (KU)	17	16.7
	Other universities	27	26.5
Year of study	1st year	24	23.5
	2nd year	22	21.6
	3rd year	29	28.4
	4th year	27	26.5
<i>Note. Percentages may not sum to 100 because of rounding. Province names follow Nepal's current federal designation, with former numbered labels in parentheses.</i>			

3.2 Career awareness and motivations

Family members were the primary source of initial information about pharmacy for 83.3% of students, whether through relatives working in the field or positive encounters with pharmacists. School

counsellors and teachers were cited by 52.9%; internet and social media by 39.2%; peers by 22.5%; and direct interaction with pharmacists by 19.6%. Career awareness was therefore transmitted mainly through trusted interpersonal channels rather than professional organisations or formal counselling.

Motivations were predominantly pragmatic. A high-paying job was the single most important factor for 67.6% of respondents; job security for 58.8%; helping people for 55.9%; social status for 35.3%; flexible hours for 28.4%; and intellectual interest or challenge for 18.6%. Likert means confirmed this hierarchy (Table 2): high salary 4.52 (SD 0.78), job security 4.38 (SD 0.85), helping people 4.12 (SD 0.96), social status 3.85 (SD 1.02), flexible hours 3.68 (SD 1.10), and interest/challenge 3.41 (SD 1.21). This ordering—economic security above intrinsic academic interest—is consistent with pharmacy-student surveys in other developing and middle-income settings.^{9–13,27}

Table 2
Perceived importance of career-related factors (five-point Likert scale; n = 102)

Factor	Mean	SD
High salary	4.52	0.78
Job security	4.38	0.85
Opportunity to help people	4.12	0.96
Social status	3.85	1.02
Flexible working hours	3.68	1.10
Interest/challenge of the field	3.41	1.21
<i>Note. Scale: 1 = strongly disagree to 5 = strongly agree. SD = standard deviation.</i>		

Awareness of pathways beyond community and hospital pharmacy was limited: only 40.2% reported such awareness, implying that 59.8% held a narrow, dispensing-centred view of the profession. Among all respondents, the most recognised alternative was clinical research (28.4% of the full sample; 70.6% of those who were aware of alternatives). Regulatory affairs (14.7%), pharmaceutical industry roles (12.7%), and academia (10.8%) were mentioned less often. Similar knowledge gaps have been reported among Pakistani Pharm.D. students, among whom industrial and public-sector role awareness is low relative to community and clinical pharmacy.¹⁶

3.3 Immediate career preferences and postgraduate plans

Immediately after graduation, community pharmacy was the modal preference (38.2%), followed by hospital pharmacy (31.4%). Together these patient-facing roles accounted for 69.6% of stated goals. Industry attracted 12.7%, government/public health 9.8%, and entrepreneurship 1.0% (remainder unspecified or other). Parallel to this preference for immediate employment, 73.5% planned postgraduate study. Preferred fields were clinical pharmacy (35.3%), pharmacology (28.4%), and industrial pharmacy (19.6%). Students thus treated the B.Pharm as a foundation rather than a terminal

qualification, a pattern also observed where undergraduates report high intent to undertake a second degree.¹¹

3.4 Predictors of planned postgraduate study

Binary logistic regression with planned postgraduate study as the dependent variable yielded a statistically significant final model including gender, importance of salary, and awareness of alternative careers (Nagelkerke $R^2 = 0.214$). Male students had approximately 3.5-fold higher odds of planning postgraduate study than female students (OR 3.51, 95% CI 1.12–10.97). Each one-point increase in salary importance on the five-point scale was associated with 1.82-fold higher odds (OR 1.82, 95% CI 1.24–2.68). Awareness of alternative careers was associated with lower odds of planning postgraduate study (OR 0.38, 95% CI 0.16–0.88), suggesting that a broader view of bachelor-level opportunities may reduce the perceived necessity of a further degree (Table 3).

χ^2 tests corroborated the gender finding ($\chi^2 = 8.91$, $df = 1$, $p < 0.01$): 87.8% of male students versus 59.0% of female students planned further study. Institution affiliation was associated with immediate career path ($\chi^2 = 12.45$, $df = 3$, $p < 0.05$): Tribhuvan University students showed a stronger preference for community pharmacy, whereas Pokhara University and Kathmandu University students more often preferred hospital pharmacy—possibly reflecting curriculum emphasis, training sites, or institutional reputation.

Table 3
Inferential analyses of career-related outcomes

Predictor	Test	Result	Interpretation
Gender	Logistic regression	OR 3.51 (95% CI 1.12–10.97), $p < 0.05$	Male students ~ 3.5× more likely to plan postgraduate study
Importance of salary	Logistic regression	OR 1.82 (95% CI 1.24–2.68), $p < 0.05$	Higher salary importance increases odds of planning postgraduate study
Awareness of alternatives	Logistic regression	OR 0.38 (95% CI 0.16–0.88), $p < 0.05$	Awareness of alternatives decreases odds of planning postgraduate study
Institution affiliation	χ^2 test	$\chi^2 = 12.45$, $df = 3$, $p < 0.05$	Associated with preferred immediate career path
Gender	χ^2 test	$\chi^2 = 8.91$, $df = 1$, $p < 0.01$	Associated with postgraduate intention (males 87.8% vs females 59.0%)
<i>Note. Final logistic model Nagelkerke $R^2 = 0.214$. OR = odds ratio; CI = confidence interval.</i>			

Table 4
Immediate career preference and postgraduate field (n = 102)

Outcome	Category	n	%
Immediate career preference	Community pharmacist	39	38.2
	Hospital pharmacist	32	31.4
	Pharmaceutical industry	13	12.7
	Government / public health	10	9.8
	Entrepreneurship	1	1.0
	Other / unspecified	7	6.9
Plan postgraduate study	Yes	75	73.5
	No	27	26.5
Preferred PG field (among those stating a field)*	Clinical pharmacy	36	35.3
	Pharmacology	29	28.4
	Industrial pharmacy	20	19.6
	Other / not stated	17	16.7
<i>Note. *Percentages for postgraduate field are of the full sample as reported in the source analysis. Other/unspecified immediate preference was derived so that categories sum to 102.</i>			

4. DISCUSSION

4.1 Principal findings

This exploratory pilot provides the first combined descriptive and multivariable account of career awareness and preferences among Nepali B.Pharm students. Three messages stand out. First, students enter pharmacy for pragmatic reasons—salary and security—while still valuing patient service; intellectual fascination with the science ranks last. Second, the information ecology is familial: more than four in five students learned about pharmacy from family, and institutional career guidance appears weak. Third, the cohort is ambitious (nearly three-quarters plan a master's or equivalent) but occupationally conservative (about seven in ten want community or hospital posts) and poorly informed about non-traditional roles. Male sex and salary salience predict postgraduate intention; knowing about alternative careers predicts the opposite.

4.2 Comparison with regional and international literature

The salary–security hierarchy matches findings from India, Saudi Arabia, Lebanon, South Korea, and the United States, where economic stability is a primary enrolment motive even when altruism is also

endorsed.^{9–13,27,29} Family as the leading information source echoes Lebanese and Saudi samples in which family recommendation was reported by two-thirds to 87% of students.^{11,14} Preference for community and hospital practice over industry and academia is the modal pattern in many undergraduate cohorts.^{12,27,28,30} Limited awareness of industrial, regulatory, and public-sector roles in our sample parallels evidence from Pakistan and South Africa of weak orientation to non-traditional pharmacy careers.^{16,31} The 73.5% postgraduate intention is high relative to some Western undergraduate cohorts but compatible with settings in which the first degree is not viewed as sufficient for desired income or status.^{11,32}

The gender gap—males 3.5 times more likely to plan further study, with 87.8% versus 59.0% intending postgraduate education—contrasts with many high-income countries in which women now constitute the majority of both pharmacy students and postgraduate enrolments.^{5,6,33} In Nepal it may reflect household expectations regarding marriage, mobility, and who is expected to make long educational investments, as well as differences in academic self-efficacy. Targeted mentorship, scholarships, and visible female faculty role models are reasonable responses pending qualitative work to unpack mechanisms.

The inverse association between alternative-career awareness and postgraduate plans is noteworthy. Students who already see viable bachelor-level destinations in industry, regulation, or research may feel less pressure to stack credentials. Those with a narrow dispensing schema may view a master's as the only route to differentiation and higher pay. If replicated, this finding argues that career education can both widen first-job options and change the demand for postgraduate seats.

4.3 Implications for education, regulation, and the labour market

Universities should treat career development as a curricular outcome, not an extracurricular afterthought: structured counselling; guest practitioners from regulation (DDA), industry (APPON members), pharmacovigilance, academia, and public health; and modules in regulatory science, pharmacoeconomics, and drug development.^{8,20,22} Reflective tools such as electronic portfolios embedded in experiential rotations can document this competency development across the degree.³⁴ Differences by university in community versus hospital preference suggest that experiential placements shape intent,³⁵ equitable access to hospital clerkships across affiliations may reduce path-dependence. The Nepal Pharmacy Council and Medical Education Commission can use these data when reviewing competency frameworks and educational standards against national and international benchmarks.^{36,37} Employers in industry and government should not assume that low expressed interest equals low potential: it more likely reflects information failure. Aligning pharmacy workforce development with the WHO Global Strategy on Human Resources for Health: Workforce 2030 and the Nepal Health Sector Strategic Plan will be essential.^{38,39} Coordinated action across education, regulation, and employment —

as called for by the WHO–UNESCO–FIP Pharmacy Education Taskforce and global workforce reviews — will be needed to convert student potential into deployed capacity.^{40,41}

4.4 Limitations

The convenience sample of 102 students limits power, precision of ORs (wide CIs), and generalisability to all Nepali pharmacy students, including diploma (pharmacy assistant) cohorts and newly established provincial campuses. Online distribution may have over-represented digitally connected, urban students. Self-report invites social-desirability and hypothetical bias (stated preference is not revealed preference). The cross-sectional design cannot establish causality or track preference change across the degree. Likert items were analysed both as interval scores in logistic models and with non-parametric tests; both approaches have recognised limitations. Province frequencies in Table 1 follow the source dataset; earlier narrative rounding of provincial clustering should be interpreted using the table. No qualitative arm was included to explain the gender gap.

4.5 Future research

A nationally representative, multi-campus survey with a published protocol, pre-registered analysis, and linked qualitative interviews is the logical next step. Longitudinal follow-up from first year through first employment would distinguish stable traits from curriculum effects. Linking student intentions to Nepal Pharmacy Council registration and DDA pharmacy-license data would test whether stated plans materialise. Discrete-choice experiments could estimate the wage premium required for rural posts.¹⁹ Future reports should adhere to STROBE and ICMJE recommendations for the reporting of observational research.^{26,42}

5. CONCLUSIONS

Nepali B.Pharm students in this pilot are pragmatically motivated, family-informed, oriented toward community and hospital practice, and largely unaware of the wider pharmaceutical labour market—yet most intend to study further. Male students and those who prize salary are more likely to plan postgraduate education; those who know about alternative careers are less likely to do so. Educators and regulators should broaden career literacy, diversify experiential learning, and address gender inequity in advanced training. Despite sample-size and design limits, the study offers a citable quantitative baseline for pharmacy workforce policy in Nepal.

Declarations

Ethics approval and consent to participate.

The study was conducted in accordance with the Declaration of Helsinki. As this research involved an anonymous, minimal-risk educational survey collecting no personally identifiable health data, formal ethics committee approval was deemed unnecessary and waived in accordance with the national guidelines of the Nepal Health Research Council (NHRC) for minimal-risk observational studies.

Participation was anonymous and voluntary, and completion of the questionnaire constituted implied informed consent. No personally identifiable information was collected.

Consent for publication.

Not applicable (no individual personal data).

Competing interests.

The authors declare that they have no competing interests.

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Author Contribution

M.T. conceived the study and drafted the manuscript. S.S. contributed to instrument design and data collection. M.T. performed statistical analysis. All authors interpreted findings, revised the manuscript critically, and approved the final version.

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Use of generative AI. There were none used.

Data Availability

De-identified data and the Stata do-file can be made available by the corresponding author on reasonable request.

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