

Original Research Article

Knowledge, attitude and preference of traditional medicines among pharmacy students: A multi-centered cross-sectional study from Pakistan

Sadia Rafique¹, Aamna Habib², Abdul Qader^{3*}, Amber Shafi², Qudsia Rehman², Kainat Ilyas³, Romana Riaz⁴

¹Department of Pharmacy, ²Madina College of Pharmacy, The University of Faisalabad, Faisalabad, ³Department of Pharmaceutical Chemistry, Government College University Faisalabad, ⁴Department of Pharmaceutics, Bahauddin Zakariya University, Multan, Pakistan

*For correspondence: **Email:** Pharmacistqader316@gmail.com

Sent for review: 3 May 2024

Revised accepted: 19 November 2025

Abstract

Purpose: To determine the knowledge and understanding of traditional medicines among Pharmacy students and to evaluate students' perspectives, attitudes, and inclinations concerning traditional remedies.

Methods: Undergraduate Pharmacy students in Punjab, Pakistan, from 3rd to 5th year participated in the online survey. The survey targeted various aspects, including beliefs regarding the effectiveness of traditional medicines, their compatibility with conventional allopathic treatments, and preferences for specific types of medications depending on health conditions.

Results: A total of 535 respondents (58.9 % females and 41.1 % males) completed the survey. Among the respondents, 70 % had taken herbal medicines and 58.9 % believed that herbal medicines only cured the symptoms. About 66 % believed that herbal medicines were less effective as compared to allopathic medicines, while half of the respondents considered concurrent use of homeopathic and allopathic medicines safe. Most of the respondents used herbal medicines for skin problems and mild illnesses, but for chronic illnesses, most of them (80 %) used allopathic medicines. Sixty percent believed that allopathic medicines were better than other medicines. Significant differences occurred with reports of side effects, effectiveness and awareness of herbal medicines and their concurrent use with allopathic medicines ($p < 0.001$). There were also significant differences regarding effectiveness and awareness of homeopathic medicines, the number of healthcare service visits after using homeopathic medicines and encouraging others to use homeopathic medicines ($p < 0.001$).

Conclusion: The study indicates varying beliefs regarding the effectiveness and safety of herbal medicines compared to allopathic treatments. Further studies and educational interventions may be warranted to enhance understanding and promote safe and informed use of traditional medicines among pharmacy students.

Keywords: Traditional, Allopathic, Homeopathic, Medicine

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided the original work is properly credited.

Tropical Journal of Pharmaceutical Research is indexed by Scopus, Chemical Abstracts, Embase, Index Copernicus, EBSCO, African Index Medicus, JournalSeek, Directory of Open Access Journals (DOAJ), African Journal Online, Bioline International, Open-J-Gate and Pharmacy Abstracts

INTRODUCTION

Throughout history, various solutions have been employed to enhance and preserve the general

health and wellness of individuals. As time progressed, certain traditional approaches once utilized have developed beyond the scope of conventional allopathic medicine [1]. World

Health Organization (WHO) characterizes traditional medicine as the comprehensive understanding, abilities, and methods grounded in the theories, convictions, and experiences intrinsic to diverse cultures. Whether understandable or not, these practices are employed for the preservation of health and play a role in preventing, diagnosing, enhancing, or treating both physical and mental illnesses [2]. Data from the WHO reports that 88 % of member states recognize their utilization of traditional medicines, which equates to 170 states acknowledging their use [3]. In the contemporary age, individuals have access to not just conventional Western medical treatments, often referred to as allopathic medicine, but also numerous alternative forms of therapy. Among these, homeopathy stands out as a widely embraced and secure alternative medical approach practiced globally [4].

The term "homeopathy" originates from the Greek words "Homoios" (meaning similar or same) and "pathos" (meaning suffering) [5]. Homeopathy is an approach to healing that involves the use of preparations containing substances whose effects, when given to healthy individuals, mimic the symptoms, clinical signs, and pathological states observed in the specific disorder of the individual patient [6]. Homoeopaths employ minimal doses of preparations to treat illnesses based on the principle that "like should be cured with like". The concept of homeopathy was initially formulated by the German physician, Samuel Hahnemann, in 1796 [7]. The prominence of homeopathy in the 19th century was attributed to its effectiveness in addressing widespread diseases like cholera, yellow fever and typhus [8]. Homeopathy has been integrated into the national health systems of some nations, including India, Switzerland, Chile, Mexico, Brazil and Pakistan and is actively practiced in 40 out of the 42 European countries [3]. Despite a prevailing inclination towards herbal medications and homeopathy, the allopathic system continues to be the primary preference in cases of medical emergencies. The significance of synthetic products in the contemporary era has eclipsed other approaches. In the modern system, which relies on synthetic drugs, individuals typically only encounter symptomatic relief, and achieving a complete cure is seldom a reality, particularly in chronic conditions. This is compounded by frustrating side effects and the considerable cost associated with the treatment [9].

Primary care providers and Pharmacists stand out as highly trusted healthcare professionals

with widespread accessibility to patients. Pharmacists, in many countries, play a pivotal role in patient interactions, offering information and guidance on the safe and effective use of all medications. Despite this, Pharmacists commonly express a lack of confidence in their understanding of traditional medicines and often feel insufficiently equipped to address various patient queries [10]. The practice of herbal and homeopathic medicines is also inadequate. Pharmacy students in Pakistan study traditional medicines during their 2nd and 3rd year of professional course, but due to lack of practice, they are unable to implement their knowledge. This study addresses gaps in existing literature by focusing on the knowledge, attitude and preference of traditional medicines among Pharmacy students in Pakistan, particularly in Punjab. It aims to provide a comprehensive understanding of the students' perceptions and utilization of traditional remedies, including herbal and homeopathic treatments. Through this exploration, the study intends to identify misconceptions, knowledge gaps and areas for improvement within the Pharmacy curriculum, ultimately informing educational strategies and enhancing professional practices in the field. Furthermore, the study seeks to investigate Pharmacy students' preferences for traditional medicines across different health conditions and compare them with modern allopathic treatments, shedding light on their perceptions of efficacy, safety and prospects. By pursuing these objectives, the study seeks to provide valuable insights that can guide healthcare policies, educational initiatives and professional standards concerning traditional medicines in the pharmacy sector of Pakistan.

EXPERIMENTALS

Study design

The study employed an online questionnaire-based cross-sectional design to assess the knowledge, attitude and preference of traditional medicines among Pharmacy students in Punjab, Pakistan. The response to the questionnaire was open from June 2023 to August 2023.

Population and sample

The target population included 3rd, 4th and 5th year Pharm-D students in Punjab, Pakistan who were invited to participate in the survey, as announced by participating researchers across six universities, viz the University of Central Punjab, Government College University Faisalabad, University of Agriculture Faisalabad, Madina University, Bahauddin Zikriya University

and the University of Sargodha. Sample size was determined using the Daniel formula, with a confidence interval (CI) of 95 % and a significance level set at $\alpha = 0.05$. Anticipating a prevalence of 0.5 in the sample with a particular characteristic and considering a total population of 900 Pharmacy students across five universities, the authors initially calculated that a representative sample size for Pharmacy students from Jordan and WBP (West Bank of Palestine) would be 360. However, to enhance the statistical robustness of this study, a larger sample size of 535 students was recruited to complete the online questionnaire. Notably, the selected five universities are prominent in Punjab, being top-ranked institutions with significant pharmaceutical academic programs that willingly participated in the study.

Inclusion and exclusion criteria

The 3rd, 4th and 5th year undergraduate students of Pharmacy, who were willing to participate in the study, were included. Duplicate, incomplete and irrelevant responses were excluded.

Ethical approval

Prior to commencing the study, the Institutional Review Board at Government College University, Faisalabad, approved the study, with a specific mention of verbal consent. As the study did not involve any clinical interventions and the participants' engagement posed minimal risk, all participants provided informed consent verbally, obviating the need for written consent.

Study tool

The questionnaire commenced with an introductory segment outlining the intent and goals of this study. The survey was structured into four sections as follows: gathering demographic information about the students, assessing their familiarity with herbal medicines, evaluating their knowledge of homeopathic drugs, and exploring the utilization of various medical systems for different health conditions.

Data collection

The online survey was made available to participants from June 2023 to August 2023. Eligible students across the six participating universities were invited to complete the questionnaire, which was administered electronically.

Prior to distributing the questionnaire to students, it underwent scrutiny by three experts within the

Pharmacy Department of Government College University, Faisalabad. Subsequently, the questionnaire underwent a pilot study involving 30 students to identify any errors or misunderstood questions. The Cronbach's alpha for knowledge was determined to be 0.72, signifying questionnaire consistency. Categorical variables, encompassing demographic information and knowledge about traditional medicines, are presented as frequencies and percentages.

Data analysis

Data were analyzed by using Statistical Package for Social Sciences (IBM SPSS Statistics for Windows, version 21.0, Armonk, NY: IBM Corp.). Categorical data was represented by percentages. A p -value of less than 0.05 was considered statistically significant. Descriptive analysis involved 2 tests, Student's t -tests, and ANOVA when applicable. The Spearman test was employed to compute correlation coefficients for categorical data. All statistical tests were conducted with a significance level of 5 % and corresponding 95 % confidence intervals were calculated.

RESULTS

Demographic distribution of participants

A total of 535 respondents (58.9 % females and 41.1 % males) completed the survey. Most of the respondents (77.6 %) lived in urban areas. The highest number of respondents were 4th year students (53.3 %) followed by 5th year (33.6 %) and 3rd year students (13.1 %). Table 1 represents the demographic characteristics of the respondents.

Table 1: Demographic characteristics of the respondents

Parameter	Categories	Frequency (%)
Age*		22.51 (1.27)
Gender	Female	315 (58.9)
	Male	220 (41.1)
Where do you live?	Rural	120 (22.4)
	Urban	415 (77.6)
Marital status	Married	20 (3.7)
	Unmarried	51 (96.3)
Year of study	3 rd	70 (13.1)
	4 th	285 (53.3)
	5 th	180 (33.6)

Knowledge of herbal medicines

Among the respondents, 70 % had taken herbal medicines and 58.9 % believed that herbal medicines only reduced the symptoms, while

41.1 % stated that these medicines completely cured the ailment. More than half of the respondents agreed that herbal medicines had side effects (55.1 %) and 51.4 % believed it was not suitable for emergencies as they took too much time. About 66.4 % of the respondents believed that herbal medicines were less effective as compared to allopathic medicines. Half of the respondents considered concurrent use of homeopathic and allopathic medicines safe. However, only 22 % had encountered a side effect while using herbal medicines and about 53 % did not visit any modern health care service after using herbal medicine because they did not need to do so. Furthermore, a few people

use herbal medicine and are aware of it, according to 59.8 % respondents. On the other hand, 26.2 % encourage others to use herbal medicine because they consider it cost-effective. Interestingly, nearly 58 % of the respondents had plans to use herbal medicines in the future to access modern medicines, while most of the respondents (74.8 %) believed that there are more quacks in herbal medicines as compared to allopathy. In addition, more than half of the respondents rated scientific research in herbal medicines as average. Table 2 represents the knowledge of respondents about herbal medicines.

Table 2: Knowledge of respondents about herbal medicines

Variable	Categories	Frequency (%)
Have you ever taken herbal medicine?	No	160 (29.9)
	Yes	375 (70.1)
In your opinion, how effective are herbal medicines?	Cure completely	220 (41.1)
	Only reduce symptoms	315 (58.9)
Do herbal medicines have side effects?	No	240 (44.9)
	Yes	295 (55.1)
Effectiveness of herbal medicines compared to allopathic medicine	Equally effective	125 (23.4)
	Less effective	355 (66.4)
	More effective	55 (10.3)
	Both	275 (51.4)
Time taken by herbal Medicine for healing	Not fit for emergencies	150 (28.0)
	Takes too much time	110 (20.6)
How many people do you know who use herbal medicine and are aware of it?	A few persons	320 (59.8)
	Many	130 (24.3)
	No one	85 (15.9)
Have you encountered any allergic reactions or side effects with herbal medicines?	No	415 (77.6)
	Yes	120 (22.4)
How many people do you know who use herbal medicine and are aware of it?	A few persons	320 (59.8)
	Many	130 (24.3)
	No one	85 (15.9)
How do you consider the concurrent use of herbal medicines and allopathic drugs?	Not safe	265 (49.5)
	Safe	270 (50.5)
Have you ever visited modern health care service after using herbal medicine? If yes, then why?	I didn't need to visit the doctor	285 (53.3)
	No improvement	155 (29.0)
Have you ever visited modern health care service after using herbal medicine? If yes, then why?	Side effects	95 (17.8)
Do you have plans to use herbal medicine in the future? If not, why?	Access to modern medicine	315 (58.9)
Do you have plans to use herbal medicine in the future? If not, why?	Fear of side effects	75 (14.0)
Do you encourage others to use herbal medicine? If yes, why?	I will use herbal medicine	145 (27.1)
Do you encourage others to use herbal medicine? If yes, why?	Cost effective	140 (26.2)
Do you encourage others to use herbal medicine? If yes, why?	I do not encourage	155 (29.0)
Do you believe there are more quacks in herbal medicine compared to allopathy?	Fewer side effects	240 (44.9)
Do you believe there are more quacks in herbal medicine compared to allopathy?	No	130 (24.3)
How do you rate scientific research in herbal medicine? (1=very poor, 2=poor, 3=average, 4=good, 5=very good)	Option 3	5 (0.9)
How do you rate scientific research in herbal medicine? (1=very poor, 2=poor, 3=average, 4=good, 5=very good)	Yes	400 (74.8)
	1.00	45 (8.4)
	2.00	60 (11.2)
	3.00	275 (51.4)
	4.00	140 (26.2)
	5.00	15 (2.8)

Statistically significant variations were observed in the use of herbal medicines in rural and urban respondents regarding time taken by herbal medicines for healing ($p = 0.001$) awareness of people about herbal medicines ($p = 0.043$), allergic reaction with herbal medicines ($p = 0.045$), concurrent use of herbal and allopathic medicines ($p = 0.003$), encouraging others to use herbal medicines ($p = 0.001$) and more quacks in herbal medicines as compared to allopathy ($p = 0.001$). Students in their 3rd, 4th and 5th year had significant variations ($p < 0.001$) in the use of herbal medicines regarding side effects, effectiveness and awareness of herbal medicines and their concurrent use with allopathic medicines. Significant variations ($p < 0.001$) were also found regarding visiting healthcare services after using herbal medicines, plans of using herbal medicines in the future and encouraging others to use herbal medicines, as well as rating of scientific research in herbal medicine. Table 3 highlights the categorization of knowledge of respondents about herbal medicines according to residence and year of study.

Knowledge of homeopathic medicines

Regarding homeopathic medicines, about 55 % had used them. Majority of the respondents (87.9 %) agreed that “the body is essentially self-healing and the task of health care provider (homeopathic) is to assist in healing process.” Many respondents had the view that homeopathic medicines only reduced the symptoms (63 %) and can be used for all age groups (76.6 %). More than half of the respondents (54.2 %) believed that homeopathic medicines had no side effects. About 50 % did not visit any modern health care service after using homeopathic medicine. Three-quarters of the respondents (75.7 %) believed that there are more quacks in homeopathic medicines as compared to allopathy, while nearly 57 % of the respondents did not have plans to use homeopathic medicines in the future because of access to modern medicines. A few people used herbal medicine and were aware of it according to 53.3 % respondents while 55.1 % considered the concurrent use of homeopathy and allopathy safe. Furthermore, about 55 % of respondents rated scientific research in homeopathic medicines as average (Table 4).

Statistically significant variations ($p < 0.001$) were found among rural and urban respondents regarding effectiveness and use of homeopathic medicines, with results showing more quacks in homeopathic medicine compared to allopathy ($p = 0.009$). Significant differences ($p < 0.001$) were

also found in 3rd, 4th and 5th year students regarding effectiveness and awareness of homeopathic medicines, awareness of people about homeopathy medicine, visiting healthcare services after using homeopathic medicines and encouraging others to use homeopathic medicines. Plans to use homeopathic medicine in the future ($p = 0.002$) and have side effects ($p = 0.003$). Table 5 gives the Categorization of knowledge of respondents about homeopathic medicines according to residence and year of study.

Preference for different system of medicine

Majority of the respondents used herbal medicines for skin problems (29.2 % in rural areas, 70.8 % in urban areas and 66.7 % of 4th year students) and mild illnesses (78 % in urban, 21 % in rural and 58.7 % of 4th year students), but for chronic illness, most of the participants (80 %) used allopathic medicines. Also, majority of the participants (60 %) believed that allopathic medicines were better than other medicines, as illustrated in Figure 1. Significant differences ($p < 0.001$) were found in all respondents regarding the use of different systems of medicines in different conditions and the rating of these systems of medicines. Table 6 represents the preference of respondents for different systems of medicine in different conditions.

DISCUSSION

The study on Pharmacy students' knowledge and preferences regarding traditional medicines in Punjab, Pakistan, uncovered several notable findings. The findings of study highlight the need for enhanced education and training on traditional medicines to improve the knowledge and practices of Pharmacy students in Pakistan. A recent study by Stayduhar identified significant knowledge gaps concerning herbal supplements/natural products among both pharmacists and students [11]. Contrary to the findings of this study, the population in Nigeria demonstrated a good understanding of traditional medicine, particularly herbal medicine, for managing fever and malaria [12]. About half of the respondents (55 %) also considered the concurrent use of herbal and allopathic drugs safe. Concurrent use without the recommendation of healthcare professionals can lead to drug interactions and toxicity. The findings from this study were different from those of another study conducted in Ethiopia, where the majority of the respondents had good knowledge about traditional medicines [13].

Table 3: Categorization of knowledge of respondents about herbal medicines according to residence and year of study

Variable	Categories	Where do you live?		P-value	Year of study			P-value
		Rural	Urban		3 rd	4 th	5 th	
Do herbal medicines have side effects?	No	55 (22.9)	185 (77.1)	0.808	55 (22.9)	105 (43.8)	80 (33.3)	0.000
	Yes	65 (22)	230 (78)		15 (5.1)	180 (61)	100 (33.9)	
Effectiveness of herbal medicines compared to allopathic medicine	Equally effective	20 (16)	105 (84)	0.124	20 (16)	80 (64)	25 (20)	0.001
	Less effective	85 (23.9)	270 (76.1)		45 (12.7)	170 (47.9)	140 (39.4)	
	More effective	15 (27.3)	40 (72.7)		5 (9.1)	35 (63.6)	15 (27.3)	
	Both	40 (14.5)	235 (85.5)		35 (12.7)	140 (50.9)	100 (36.4)	
Time taken by herbal medicine for healing	Not fit for emergencies	55 (36.7)	95 (63.3)	0.000	15 (10)	95 (63.3)	40 (26.7)	0.030
	Takes too much time	25 (22.7)	85 (77.3)		20 (18.2)	50 (45.5)	40 (36.4)	
How many people do you know who use herbal medicine and are aware of it?	A few persons	75 (23.4)	245 (76.6)	0.043	35 (10.9)	160 (50)	125 (39.1)	0.001
	Many	20 (15.4)	110 (84.6)		15 (11.5)	75 (57.7)	40 (30.8)	
	No one	25 (29.4)	60 (70.6)		20 (23.5)	50 (58.8)	15 (17.6)	
Have you encountered any allergic reactions or side effects with herbal medicines?	No	85 (20.5)	330 (79.5)	0.045	55 (13.3)	215 (51.8)	145 (34.9)	0.426
	Yes	35 (29.2)	85 (70.8)		15 (12.5)	70 (58.3)	35 (29.2)	
How do you consider the concurrent use of herbal medicines and allopathic drugs?	Not safe	45 (17)	220 (83)	0.003	25 (9.4)	130 (49.1)	110 (41.5)	0.000
	Safe	75 (27.8)	195 (72.2)		45 (16.7)	155 (57.4)	70 (25.9)	
Have you ever visited modern health care service after using herbal medicine? If yes, then why	I didn't need to visit the doctor	60 (21.1)	225 (78.9)	0.489	20 (7)	150 (52.6)	115 (40.4)	0.000
	No improvement	40 (25.8)	115 (74.2)		15 (9.7)	100 (64.5)	40 (25.8)	
	Side effects	20 (21.1)	75 (78.9)		35 (36.8)	35 (36.8)	25 (26.3)	
Do you have plans to use herbal medicine in the future? If not, why	Access to modern medicine	65 (20.6)	250 (79.4)	0.217	45 (14.3)	150 (47.6)	120 (38.1)	0.001
	Fear of side effects	15 (20)	60 (80)		5 (6.7)	40 (53.3)	30 (40)	
	I will use herbal medicine	40 (27.6)	105 (72.4)		20 (13.8)	95 (65.5)	30 (20.7)	
Do you encourage others to use herbal medicine? If yes, why	Cost effective	50 (35.7)	90 (64.3)	0.000	20 (14.3)	75 (53.6)	45 (32.1)	0.000
	I do not encourage	15 (9.7)	140 (90.3)		0 (0)	65 (41.9)	90 (58.1)	
	Fewer side effects	55 (22.9)	185 (77.1)		50 (20.8)	145 (60.4)	45 (18.8)	
Do you believe there are more quacks in herbal medicine compared to allopathy?	No	35 (26.9)	95 (73.1)	0.000	20 (15.4)	70 (53.8)	40 (30.8)	0.231
	Option 3	5 (100)	0 (0)		0 (0)	5 (100)	0 (0)	
	Yes	80 (20)	320 (80)		50 (12.5)	210 (52.5)	140 (35)	
How do you rate scientific research in herbal medicine? (1=very poor, 2=poor, 3=average, 4=good, 5=very good)	1.00	10 (22.2)	35 (77.8)	0.052	5 (11.1)	15 (33.3)	25 (55.6)	0.000
	2.00	5 (8.3)	55 (91.7)		0 (0)	30 (50)	30 (50)	
	3.00	70 (25.5)	205 (74.5)		40 (14.5)	145 (52.7)	90 (32.7)	
	4.00	30 (21.4)	110 (78.6)		25 (17.9)	80 (57.1)	35 (25)	
	5.00	5 (33.3)	10 (66.7)		0 (0)	15 (100)	0 (0)	

Values are reported as n (%)

Table 4: Knowledge of respondents about homeopathic medicines

Variable	Categories	Frequency (%)
The body is essentially self-healing and the task of the health care provider (homeopathic) is to assist in the healing process. Do you agree with this approach?	No	65 (12.1)
	yes	470 (87.9)
Have you ever taken homeopathic medicine?	No	240 (44.9)
	Yes	295 (55.1)
In your opinion, how effective are homeopathic medicines?	Cure completely	195 (36.4)
	Only reduce symptoms	340 (63.6)
	Equally effective	145 (27.1)
	Less effective	325 (60.7)
Effectiveness of homeopathic medicines compared to allopathic medicine	More effective	65 (12.1)
	For all age groups	410 (76.6)
Homeopathic medicines can be used for?	Only adults	95 (17.8)
	Only children	30 (5.6)
How do you consider the concurrent use of homeopathic drugs and allopathic drugs?	Not safe	240 (44.9)
	Safe	295 (55.1)
Do homeopathic medicines have side effects?	No	290 (54.2)
	Yes	245 (45.8)
How many people do you know who use homeopathic medicine and are aware of it?	A few persons	285 (53.3)
	Many	140 (26.2)
	No one	110 (20.6)
	I didn't need to visit the doctor	270 (50.5)
Have you ever visited modern health care service after using homeopathic medicine? If yes, then why?	No improvement	160 (29.9)
	Side effects	105 (19.6)
	Access to modern medicine	310 (57.9)
Do you have plans to use homeopathic medicine in the future? If not, why?	Fear of side effects	70 (13.1)
	I will use	155 (29.0)
	Cost effective	185 (34.6)
	I do not encourage	165 (30.8)
Do you encourage others to use homeopathic medicine? If yes, why?	Fewer side effects	185 (34.6)
	No	130 (24.3)
	Yes	405 (75.7)
	1.00	25 (4.7)
Do you believe there are more quacks in homeopathic medicine compared to allopathy?	2.00	75 (14.0)
	3.00	295 (55.1)
	4.00	110 (20.6)
	5.00	30 (5.6)
How do you rate scientific research in homeopathic medicine? (1=very poor, 2=poor, 3=average, 4=good, 5=very good)		

It was revealed in this study that students had the perception that there were more quacks in herbal and homeopathic medicines compared to allopathy. This also indicates the lack of knowledge of the respondents regarding traditional medicines, since it is not the case. Quack practices and pseudoscientific healing methods exist across medical systems worldwide, sometimes leading to serious toxicity [17]. Most of the respondents had no plans to use herbal medicines in the future because 57.9 % of them thought they had access to modern medicine and 13 % had the fear of having side effects with homeopathic medicine. This is also due to the wrong beliefs of the students and it also shows the lack of practice of traditional medicines in Pakistan. Due to this, people must move towards more expensive therapies, leading to an increase in treatment costs. Some other studies also found the use of traditional medicines in different dosage forms in certain ailments [14]. Despite their limited knowledge

about Complementary and Alternative Medicine (CAM), students in a study by Ashraf *et al.* exhibited positive attitudes and beliefs regarding CAM. They also expressed a willingness to enhance their knowledge and supported the inclusion of CAM in the curriculum [1]. The study highlighted that although healthcare professionals (HCPs) generally had a positive attitude towards CAM, their knowledge scores were low. Therefore, the survey recommended the establishment of evidence-based guidelines for the rational use of CAM and the updating of undergraduate health program syllabi to help future HCPs improve their knowledge and achieve better health outcomes for the general public [15]. Another study assessed the knowledge, attitudes and practices of graduating medical and health science students towards CAM and found that, despite their positive attitudes, their overall understanding and practice were limited.

Table 5: Categorization of knowledge of respondents about homeopathic medicines according to residence and year of study

Variable	Categories	Where do you live?		P-value	Year of study			P-value
		Rural	Urban		3 rd	4 th	5 th	
The body is essentially self-healing and the task of the health care provider (homeopathic) is to assist in the healing process.	No	10 (15.4)	55 (84.6)	0.146	10 (15.4)	30 (46.2)	25 (38.5)	0.469
	Yes	110 (23.4)	360 (76.6)		60 (12.8)	255 (54.3)	155 (33)	
Have you ever taken homeopathic medicine?	No	50 (20.8)	190 (79.2)	0.425	40 (16.7)	95 (39.6)	105 (43.8)	0.000
	Yes	70 (23.7)	225 (76.3)		30 (10.2)	190 (64.4)	75 (25.4)	
In your opinion, how effective are homeopathic medicines?	Cure completely	35 (17.9)	160 (82.1)	0.060	40 (20.5)	100 (51.3)	55 (28.2)	0.000
	Only reduce symptoms	85 (25)	255 (75)		30 (8.8)	185 (54.4)	125 (36.8)	
	Equally effective	20 (13.8)	125 (86.2)		45 (31)	65 (44.8)	35 (24.1)	
Effectiveness of homeopathic medicines compared to allopathic medicine	Less effective	75 (23.1)	250 (76.9)	0.000	20 (6.2)	175 (53.8)	130 (40)	0.000
	More effective	25 (38.5)	40 (61.5)		5 (7.7)	45 (69.2)	15 (23.1)	
	For all age groups	75 (18.3)	335 (81.7)		55 (13.4)	220 (53.7)	135 (32.9)	
Homoeopathic medicines can be used for?	Only adults	40 (42.1)	55 (57.9)	0.000	10 (10.5)	50 (52.6)	35 (36.8)	0.872
	Only children	5 (16.7)	25 (83.3)		5 (16.7)	15 (50)	10 (33.3)	
	Not safe	50 (20.8)	190 (79.2)		20 (8.3)	125 (52.1)	95 (39.6)	
How do you consider the concurrent use of homeopathic drugs and allopathic drugs?	Safe	70 (23.7)	225 (76.3)	0.425	50 (16.9)	160 (54.2)	85 (28.8)	0.002
	No	70 (24.1)	220 (75.9)		50 (17.2)	140 (48.3)	100 (34.5)	
Do homeopathic medicines have side effects?	Yes	50 (20.4)	195 (79.6)	0.303	20 (8.2)	145 (59.2)	80 (32.7)	0.003
	A few persons	60 (21.1)	225 (78.9)		35 (12.3)	145 (50.9)	105 (36.8)	
How many people do you know who use homeopathic medicine and are aware of it?	Many	30 (21.4)	110 (78.6)	0.392	15 (10.7)	65 (46.4)	60 (42.9)	0.000
	No one	30 (27.3)	80 (72.7)		20 (18.2)	75 (68.2)	15 (13.6)	
	I didn't need to visit the doctor	55 (20.4)	215 (79.6)		25 (9.3)	145 (53.7)	100 (37)	
Have you ever visited modern health care service after using homeopathic medicine? If yes, then why	No improvement	35 (21.9)	125 (78.1)	0.227	15 (9.4)	85 (53.1)	60 (37.5)	0.000
	Side effects	30 (28.6)	75 (71.4)		30 (28.6)	55 (52.4)	20 (19)	
	Access to modern medicine	60 (19.4)	250 (80.6)		30 (9.7)	160 (51.6)	120 (38.7)	
Do you have plans to use homeopathic medicine in the future? If not, why?	Fear of side effects	15 (21.4)	55 (78.6)	0.061	10 (14.3)	35 (50)	25 (35.7)	0.002
	I will use	45 (29)	110 (71)		30 (19.4)	90 (58.1)	35 (22.6)	
	Cost effective	40 (21.6)	145 (78.4)		35 (18.9)	85 (45.9)	65 (35.1)	
Do you encourage others to use homeopathic medicine? If yes, why?	I do not encourage	30 (18.2)	135 (81.8)	0.133	15 (9.1)	75 (45.5)	75 (45.5)	0.000
	Fewer side effects	50 (27)	135 (73)		20 (10.8)	125 (67.6)	40 (21.6)	
	No	40 (30.8)	90 (69.2)		20 (15.4)	70 (53.8)	40 (30.8)	
Do you believe there are more quacks in homeopathic medicine compared to allopathy?	Yes	80 (19.8)	325 (80.2)	0.009	50 (12.3)	215 (53.1)	140 (34.6)	0.569
	1.00	10 (40)	15 (60)		0 (0)	15 (60)	10 (40)	
How do you rate scientific research in homeopathic medicine? (1=very poor, 2=poor, 3=average, 4=good, 5=very good)	2.00	0 (0)	75 (100)	0.000	5 (6.7)	40 (53.3)	30 (40)	0.000
	3.00	80 (27.1)	215 (72.9)		45 (15.3)	130 (44.1)	120 (40.7)	
	4.00	20 (18.2)	90 (81.8)		15 (13.6)	80 (72.7)	15 (13.6)	
	5.00	10 (33.3)	20 (66.7)		5 (16.7)	20 (66.7)	5 (16.7)	

Values are reported as n (%)

Table 6: Preference of respondents about different systems of medicine in different conditions

Variable	Categories	Where do you live?		P-value	Year of study			P-value
		Rural	Urban		3 rd	4 th	5 th	
Which system of medicine do you prefer for skin problems?	Allopathic	30 (14.3)	180 (85.7)	0.001	20 (9.5)	95 (45.2)	95 (45.2)	0.000
	Herbal	70 (29.2)	170 (70.8)		35 (14.6)	160 (66.7)	45 (18.8)	
	Homoeopathic	20 (23.5)	65 (76.5)		15 (17.6)	30 (35.3)	40 (47.1)	
Which system of medicine do you prefer for mild illnesses like common cold?	Allopathic	35 (16.7)	175 (83.3)	0.000	25 (11.9)	110 (52.4)	75 (35.7)	0.000
	Herbal	50 (21.7)	180 (78.3)		20 (8.7)	135 (58.7)	75 (32.6)	
	Homoeopathic	35 (36.8)	60 (63.2)		25 (26.3)	40 (42.1)	30 (31.6)	
Which system of medicine do you prefer for chronic illnesses like hypertension, diabetes, etc.?	Allopathic	100 (22.5)	345 (77.5)	0.041	45 (10.1)	240 (53.9)	160 (36)	0.000
	Herbal	5 (11.1)	40 (88.9)		20 (44.4)	25 (55.6)	0 (0)	
	Homoeopathic	15 (33.3)	30 (66.7)		5 (11.1)	20 (44.4)	20 (44.4)	
Which system of medicine is better in your opinion?	Allopathic	50 (15.9)	265 (84.1)	0.000	30 (9.5)	155 (49.2)	130 (41.3)	0.000
	Herbal	25 (26.3)	70 (73.7)		25 (26.3)	65 (68.4)	5 (5.3)	
	Homeopathic	45 (36)	80 (64)		15 (12)	65 (52)	45 (36)	
Which system of medicine will you prefer in case of medical emergency?	Allopathic	95 (20.4)	370 (79.6)	0.016	55 (11.8)	255 (54.8)	155 (33.3)	0.076
	Herbal	5 (33.3)	10 (66.7)		5 (33.3)	5 (33.3)	5 (33.3)	
	Homeopathic	20 (36.4)	35 (63.6)		10 (18.2)	25 (45.5)	20 (36.4)	
Overall rating of the allopathic system of medicine on a scale of 5. (1=very poor, 2=poor, 3=average, 4=good, 5=very good)	1.00	5 (25)	15 (75)	0.000	5 (25)	5 (25)	10 (50)	0.000
	2.00	0 (0)	10 (100)		0 (0)	10 (100)	0 (0)	
	3.00	65 (43.3)	85 (56.7)		35 (23.3)	65 (43.3)	50 (33.3)	
	4.00	30 (11.3)	235 (88.7)		20 (7.5)	165 (62.3)	80 (30.2)	
	5.00	20 (22.2)	70 (77.8)		10 (11.1)	40 (44.4)	40 (44.4)	
Overall rating of herbal medical system of medicine on a scale of 5. (1=very poor, 2=poor, 3=average, 4=good, 5=very good)	1.00	5 (50)	5 (50)	0.000	5 (50)	5 (50)	0 (0)	0.000
	2.00	0 (0)	30 (100)		0 (0)	0 (0)	30 (100)	
	3.00	70 (22.2)	245 (77.8)		50 (15.9)	150 (47.6)	115 (36.5)	
	4.00	25 (17.9)	115 (82.1)		10 (7.1)	100 (71.4)	30 (21.4)	
	5.00	20 (50)	20 (50)		5 (12.5)	30 (75)	5 (12.5)	
Overall rating of homoeopathic medical system of medicine on a scale of 5. (1=very poor, 2=poor, 3=average, 4=good, 5=very good)	1.00	0 (0)	20 (100)	0.000	0 (0)	10 (50)	10 (50)	0.000
	2.00	5 (11.1)	40 (88.9)		10 (22.2)	15 (33.3)	20 (44.4)	
	3.00	70 (22.6)	240 (77.4)		40 (12.9)	140 (45.2)	130 (41.9)	
	4.00	15 (13)	100 (87)		10 (8.7)	85 (73.9)	20 (17.4)	
	5.00	30 (66.7)	15 (33.3)		10 (22.2)	35 (77.8)	0 (0)	

Values are reported as n (%)

This study also revealed that Pharmacy students who had taken CAM courses had more knowledge and better attitudes than students from other departments who had not taken such courses. Consequently, it is essential to incorporate CAM into the curricula of all health professional education programs [16]. This study

has significant implications for healthcare education and practice. By revealing the knowledge gaps and misconceptions about herbal and homeopathic remedies among Pharmacy students, it highlights the urgent need for curriculum improvements to address these deficiencies. Enhancing education on traditional

medicines could empower future healthcare professionals to deliver more comprehensive and patient-centered care, especially as the integration of traditional medicine becomes more common in the healthcare landscape. Moreover, these findings highlight the importance of public engagement in the safe use of products, reflecting broader vigilance principles that can apply to traditional medicines as well.

The safe and effective use of traditional medicines could enhance healthcare accessibility and affordability. By providing Pharmacy students with accurate, evidence-based knowledge about traditional medicines, healthcare systems will be able to better cater to the diverse needs and preferences of patients, ultimately improving health outcomes and promoting holistic care [18].

Limitations of the study

This study included a limited number of questions, which might not be enough to determine the knowledge of Pharmacy students about traditional medicines in all regards. One key limitation is the reliance on self-reported data from a specific group of Pharmacy students in Punjab, which may not be representative of the broader population or healthcare professionals in other regions. Additionally, the study's cross-sectional design restricts the ability to establish causal relationships or observe changes in knowledge and attitudes over time. Future studies could benefit from longitudinal studies with a more diverse sample of healthcare students and professionals to provide a more comprehensive understanding of knowledge and attitudes towards traditional medicines.

CONCLUSION

Pharmacy students in Pakistan possess insufficient knowledge of herbal and homeopathic medicines. Consequently, the practice in this regard is also lacking. It is imperative to improve the knowledge of pharmacy students so that they can contribute to providing safe and cost-effective treatment to the public. Ultimately, this will help improve the health status of the country.

DECLARATIONS

Acknowledgement/Funding

None.

Ethical approval

None provided.

Use of Artificial intelligence/Large language models

We also declare that we did not use Generative artificial intelligence (AI) and AI-assisted technologies in writing the manuscript.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Conflict of interest

No conflict of interest is associated with this work.

Contribution of authors

We declare that this work was done by the author(s) named in this article, and all liabilities pertaining to claims relating to the content of this article will be borne by the authors.

REFERENCES

1. Ashraf M, Saeed H, Saleem Z, Rathore HA, Rasool F, Tahir E, Bhatti T, Khalid J, Bhatti I, Tariq A. A cross-sectional assessment of knowledge, attitudes and self-perceived effectiveness of complementary and alternative medicine among pharmacy and non-pharmacy university students. *BMC Complement Altern Med* 2019; 19(1): 1-12.
2. Balkrishna A, Sherma N, Srivastava D, Kukreti A, Sricastava S, Arya V. Exploring the safety, efficacy, and bioactivity of herbal medicines: Bridging traditional wisdom and modern science in healthcare. *Future Integrative Med* 2024; 3(1): 35-49.
3. WHO global report on traditional and complementary medicine 2019. 2019: World Health Organization, Geneva, Switzerland
4. Green B, Colucci E. Traditional healers' and biomedical practitioners' perceptions of collaborative mental healthcare in low-and middle-income countries: A systematic review. *Transcult Psychiatry* 2020; 57(1): 94-107.
5. Borkens Y, Endruscheit U, Lübbers CW. Homeopathy: A lively relic of the prescientific era. *Wiener klinische Wochenschrift* 2024; 136(5): 177-184.
6. Staresinic C. Homeopathy, gender and agency in German romanticism: The case of Bettina von Arnim and Annette von Droste-Hülshoff. 2021.

7. Schmidt JM., *Similia similibus curentur: Theory, history, and status of the constitutive principle of homeopathy*. *Homeopathy* 2021; 110(03): 212-221.
8. Varanasi R, Nayak D. *Homoeopathy in the management of infectious diseases: Different facets of its use and implications for the future*. *Indian J Res Homoeopath* 2020; 14(2): 110-121
9. Mortada EM. *Evidence-based complementary and alternative medicine in current medical practice*. *Cureus* 2024; 16(1): e52041.
10. Valliant SN, Burbage SC, Pathak S, Urick BY. *Pharmacists as accessible health care providers: quantifying the opportunity*. *J Manag Care Spec Pharm* 2022; 28(1): 85-90.
11. Stayduhar JM, Covvey JR, Schreiber JB, Witt-Enderby PA. *Pharmacist and student knowledge and perceptions of herbal supplements and natural products*. *Pharmacy (Basel)* 2023; 11(3): 96.
12. Ohemu TL, Shalkur D, Ohemu BO, Daniel P. *Knowledge, attitude and practice of traditional medicine among people of Jos South Local Government Area of Plateau State, Nigeria*. *J Pharm Biores* 2021; 18(2): 147-154.
13. Aragaw TJ, Afework DT, Getahun KA. *Research article assessment of knowledge, attitude, and utilization of traditional medicine among the communities of Debre Tabor Town, Amhara Regional State, North Central Ethiopia: A cross-sectional study*. *Evid Based Complement Alternat Med* 2020; 6565131
14. Tassew WC, Assefa GW, Zeleke AM, Ferede YA. *Prevalence and associated factors of herbal medicine use among patients living with chronic disease in Ethiopia: A systematic review and meta-analysis*. *Metabol Open* 2024; 21: 100280. doi: 10.1016/j.metop.2024.100280.
15. Tahir AH, Tanveer M, Shahnaz G, Saqlain M, Ayub S, Ahmed A. *Knowledge, attitude, and perceptions of healthcare professionals towards complementary and alternative medicine: a cross-sectional survey from twin cities of Pakistan*. *BMC Complement Med Ther* 2023; 23(1): 432.
16. Alehegn HZ, Asiferaw ET, Welda ZG, Emiru YK, Hussen SM, Kifle ZD, Demeke CA. *Medical and health science students' knowledge, attitude, and practice towards complementary and alternative medicine at the University of Gondar*. *Clin Epidemiol Glob Health* 2022; 17: 101148.
17. Veesar GY, Akhlaq A, Siddiqi AQ, Shoro AG. *Quackery in health is still around: pseudoscientific healing practices across the globe*. *J College Physicians Surgeons Pakistan: JCPSP* 2025; 35(1): 83-89.
18. Ilyas K, Qader A, Muneeb A, Saboor A, Aslam MA, Iqbal H, Younis M, Shaukat B. *Insight of cosmetic users regarding cosmetovigilance: A large regional study at Punjab, Pakistan*. *J Education Health Promotion* 2025; 14(1): 412.