Golestan University Of Medical Sciences
Blind Peer Reviewed Open Access
International Journal of Healthcare Management and Development (IJHMD)
ISSN: 3060-6047 Ijhmdjournal@gmail.com

Public health students' satisfaction and perceptions of a learning trip on rabies prevention, cutaneous leishmaniasis, and serological tests of brucellosis

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Abstract

Background: Traditional lecture-based instruction may not adequately support the learning objectives of public health training. Incorporating community-based educational activities is thought to enhance students' engagement and comprehension. This study examined how visiting operational units within a healthcare center influences the learning experience of public health students.

Methods: A cross-sectional survey was carried out among 97 undergraduate public health students (both continuous and discontinuous programs) who visited three departments at the Gonbad-e-Kavous healthcare center: The rabies prevention unit, the cutaneous leishmaniasis control section, and the central laboratory. After the visits, participants completed a researcher-developed questionnaire assessing satisfaction and perceived learning. Data were analyzed using independent samples t-tests with a significance threshold of 0.05.

Results: Of the students, 61 (62.9%) were female, and 50 (51.5%) were enrolled in the discontinuous bachelor's program. The mean satisfaction levels for the cutaneous leishmaniasis, rabies prevention, and brucellosis testing departments were 93.38%, 89.25%, and 82.69%, respectively. Overall satisfaction with the visits reached 92.61%. Discontinuous students reported significantly higher satisfaction with the rabies prevention and brucellosis units compared with continuous students ($P < 0.05$).

Conclusion: Students demonstrated very high satisfaction with the field visits and highlighted the value of hands-on exposure to real public health services. These findings support the integration of similar community-based experiences into public health curricula to strengthen students' understanding of practical public health activities.

Article Type: Research Article

Article History

Received: 19 December 2024
Received in revised form: 11 October 2025
Accepted: 18 November 2025
Available online:
DOI: 10.29252/IJHMD.X.X.X

Keywords

Public Health
Communicable Diseases
Experiential Learning
Rabies
Leishmaniasis Cutaneous
Brucellosis

Highlights

What is current knowledge?

Designing community-based educational activities can improve the effectiveness of teaching and help students achieve key learning objectives.

What is new here?

Brief educational field visits-such as observing the management of cutaneous leishmaniasis cases, the care of individuals exposed to animal bites, and laboratory procedures used for brucellosis diagnosis-can significantly enhance public health students' satisfaction and perceived learning.

Introduction

The prevention and control of common and regionally endemic diseases form a core component of primary healthcare services. Although major strides have been made in reducing the burden of communicable diseases, the planning and delivery of disease-specific prevention and treatment strategies-adapted to local geographic and epidemiological conditions-remain essential responsibilities of national health systems (1). Public health, as a key discipline within the health sciences, plays an important role in preparing graduates who understand the needs of individuals, families, and communities. These professionals are expected to assess health-threatening factors in the environment and implement appropriate interventions to improve population health (2). In Iran, where health services are provided through an integrated network, public health graduates must acquire the knowledge and competencies necessary to work effectively within this system (3).

Training in communicable disease control is therefore fundamental. Students must become familiar with practical approaches for preventing, managing, and eliminating infectious diseases so that they can perform their responsibilities in accordance with the guidelines of the Ministry of Health and Medical Education (4). However, traditional lecture-based teaching alone is often insufficient for achieving the learning outcomes of this course. More interactive and applied instructional methods are needed. Community-based learning has been recognized as one such method, offering deeper and more lasting learning compared with conventional instruction. By engaging directly with real public health environments, students develop greater interest, better understanding of community health challenges, and stronger problem-solving and critical-thinking skills (5-7). Constructivist educational theory also emphasizes the value of authentic learning activities-tasks that mirror real-life situations rather than abstract classroom exercises (8).

Within Iran's medical education reforms, the justice-oriented and responsive training package aims to align academic curricula with community needs and emerging health challenges. This initiative encourages the development of educational programs that enhance students' motivation, foster social accountability, and improve the capacity of the healthcare workforce (9).

Golestan Province experiences several endemic diseases of public health importance. Cutaneous leishmaniasis (CL) and some cases of visceral leishmaniasis have long been reported in areas around Maraveh Tappeh and Gonbad-e-Kavous (10). Rabies continues to pose a significant threat, with an estimated 2-6 human deaths annually in Iran and an incidence rate of 13.2 per 1,000 population based on two decades of data (11). In Kalaleh, Golestan Province, the incidence reached 654 per 100,000 population between 2016 and 2020 (12). Brucellosis, another endemic zoonotic disease, remains widespread due to factors such as nomadic populations, traditional livestock practices, and insufficient vaccination coverage. Iran reports approximately 16,000 human cases each year, making it one of the countries with the highest brucellosis burden (13-15).

In previous years, the national infectious disease control course for public health students was delivered exclusively through classroom lectures. To enhance learning outcomes, instructors redesigned the curriculum to include visits to operational units in healthcare centers. Accordingly, practical sessions involving visits to relevant departments in the Gonbad-e-Kavous healthcare network were implemented as part of the course to support achievement of its educational objectives.

Methods

Study design and participants

This cross-sectional study was conducted among 97 undergraduate public health students-both continuous and discontinuous bachelor's students-who were enrolled in the national infectious disease control course during the 2017-2018 and 2019-2020 academic years. In the Iranian medical education system, continuous students enter the bachelor's program directly after high school, whereas discontinuous students first complete an associate degree and then pursue an additional two years of study to obtain a bachelor's degree in public health. Many discontinuous students are employed within the health system and complete their studies on a part-time basis. All eligible students were included through a census approach.

Learning outcomes

Learning outcomes were defined to specify the competencies students were expected to achieve by the end of each departmental visit, as well as the observable behaviors demonstrating those competencies.

1. Cutaneous leishmaniasis (CL) department: By the end of the visit, students were expected to:
- Identify criteria for selecting local or systemic treatment of CL lesions.
- Describe the procedure for sampling Leishman bodies from suspected wounds.
- Communicate effectively with patients to obtain epidemiological histories.
- Calculate appropriate systemic doses of Glucantime based on body weight.
- Record patient demographic and treatment information electronically.
- Observe Leishman bodies microscopically.
- Administer Glucantime through intramuscular and peri-lesional injections.

2. Rabies prevention department: Expected competencies included:
- Identifying eligibility criteria for post-exposure prophylaxis with anti-rabies vaccine and/or rabies immune globulin (RbIG).
- Describing correct techniques for washing and managing animal bite wounds.
- Calculating appropriate doses of RbIG.
- Explaining patient follow-up procedures to ensure completion of the prophylaxis regimen.

3. Brucellosis diagnostic department: Expected outcomes included the ability to:
- Describe serological tests used for diagnosing Brucellosis.
- Interpret Wright, Coombs Wright, and 2-mercaptoethanol (2ME) tests.
- Identify and interpret serum dilutions and micro-agglutination reactions.

Measures

Data were collected using a questionnaire designed to assess the extent to which educational objectives were achieved. The instrument consisted of 23 items rated on a 7-point Likert scale (From strongly disagree to strongly agree), including nine items related to the CL unit, nine items on the rabies prevention unit, and five items on the Brucellosis serology laboratory. After completing the site visits, students rated each item on a scale of 1 to 7. The questionnaire was developed by the course instructor based on the course curriculum. Its content validity was reviewed and approved by three faculty members, and revisions were made based on their feedback. Reliability testing using Cronbach's alpha yielded coefficients of 0.899 for the entire questionnaire, 0.843 for the CL section, 0.407 for the rabies section, and 0.841 for the Brucellosis section. In addition, one item assessed overall satisfaction with each department on a 0-100 scale, and another item measured overall satisfaction with the entire visit on the same scale. An open-ended question invited students to suggest additional diseases or clinical units they believed would be relevant to future visits.

Procedure

The instructor coordinated with the Gonbad-e-Kavous healthcare center to identify educational needs and secure the required approvals through the Vice-Chancellor for Education. Student visits were carried out between November 2017 and November 2019, with continuous and discontinuous bachelor's students attending in alternating weeks. November was selected due to the seasonal peak of CL cases. Prior to the visits, students received theoretical instruction on CL, rabies, and Brucellosis. During the visits, students rotated through three departments:
- Leishmaniasis unit: Students observed cryotherapy procedures, intramuscular and local injections, wound sampling techniques, slide preparation and examination, and patient follow-up processes.
- Rabies prevention unit: Students learned wound-washing procedures, administration of vaccines and RbIG, safety protocols, documentation steps, and real-time patient management.
- Serology laboratory (Brucellosis): Students observed Wright's tests, serum dilution procedures, and interpretation of positive samples.

In each department, all educational activities were delivered by the respective department head, ensuring consistency of instruction and reducing variation in students' learning experiences. The visits included demonstrations, observational learning, and opportunities for questions and discussion. After completing the visits, students filled out anonymous questionnaires. Ethical approval for the study was obtained from the Ethics Committee of Golestan University of Medical Sciences (IR.GOUMS.REC.1396.236).

Statistical analysis

Data from the completed questionnaires were entered into SPSS version 15 for analysis. Descriptive statistics, including means, standard deviations, and frequencies, were calculated. Independent samples t-tests were used to compare satisfaction scores between continuous and discontinuous bachelor's students. Pearson's correlation coefficient was applied to assess the relationship between students' satisfaction scores and their grade point averages. A significance level of 0.05 was used for all statistical tests.

Results

A total of 97 students completed the visits and participated in the study. Of these, 61 students (62.9%) were female, and 50 (51.5%) were enrolled in the discontinuous bachelor's program. Students' grade point averages ranged from 13.37 to 18.24, with a mean score of 15.91 ± 1.04. Overall, students expressed high levels of satisfaction with the educational value of visiting the three operational units. Most participants reported that the visits were informative and contributed meaningfully to achieving the course's learning objectives (Table 1).

Similarly, most students reported that the visit to the rabies prevention and control department was highly educational and supported their achievement of the course learning objectives (Table 2).

In addition, most students indicated that observing Brucellosis serological procedures in the central laboratory was highly educational and contributed effectively to meeting the course's learning objectives (Table 3).

The overall satisfaction score for the combined visit was 92.61 ± 11.87 on a 0-100 scale, indicating a very high level of approval among participants. Satisfaction scores for each individual department were also high and reflected a positive learning experience (Table 4).

Table 5 presents the mean and standard deviation of student satisfaction scores for the three departments, measured on a 7-point Likert scale. The Leishmaniasis unit received the highest satisfaction scores, while the Brucellosis laboratory received the lowest; however, the differences among the departments were relatively small, indicating generally high satisfaction across all sections.

A comparison of satisfaction scores between continuous and discontinuous bachelor's students using independent samples t-tests indicated that discontinuous students reported significantly higher satisfaction with both the Brucellosis laboratory and the rabies prevention and control department compared to continuous students (Table 6).

Table 1. Frequency distribution of students' views regarding the leishmaniasis unit visit

Item	Strongly agree n (%)	Somewhat agree n (%)	Slightly agree n (%)	Undecided n (%)	Slightly disagree n (%)	Somewhat disagree n (%)	Strongly disagree n (%)
Seeing the Lieshmaniosis wound up close was very helpful and instructive for me.	89 (91.8)	8 (8.2)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
To see how cryotherapy is performed on patients up close was very helpful and instructive for me.	89 (91.8)	6 (6.2)	0 (0)	1 (1)	0 (0)	1 (1)	0 (0)
It was very helpful and instructive for me to see the topical treatment and its indications for Leishmaniasis.	83 (85.6)	11 (11.3)	2 (2.1)	1 (1)	0 (0)	0 (0)	0 (0)
Seeing up close how the systemic treatment of patients is performed with Glucantime injection and knowing its indications was very helpful and instructive for me.	84 (86.5)	9 (9.3)	1 (1)	3 (3.2)	0 (0)	0 (0)	0 (0)
It was very helpful and instructive for me to see how biopsy of a suspected Leishmaniasis wound is performed.	79 (81.4)	10 (10.3)	2 (2.1)	6 (6.2)	0 (0)	0 (0)	0 (0)
Seeing a slide containing the Leishman body under a microscope and the explanations of a laboratory expert in the Leishmaniasis unit was very helpful and instructive for me.	68 (70.1)	22 (22.7)	2 (2.1)	4 (4.1)	1 (1)	0 (0)	0 (0)
Observing the process of registering and following up patients on the forms sent by the Ministry of Health and the explanations of the treatment expert of the Leishmaniasis unit was very helpful and instructive for me.	71 (73.2)	18 (18.6)	4 (4.1)	4 (4.1)	0 (0)	0 (0)	0 (0)
Epidemiological interviews with Leishmaniasis patients and their companions were very helpful and informative for me.	68 (70.1)	23 (23.8)	3 (3.1)	1 (1)	1 (1)	0 (0)	1 (1)
The explanations of the treatment expert of the Leishmania unit and the transfer of his educational experience were very helpful and instructive for me.	82 (84.6)	11 (11.3)	1 (1)	2 (2.1)	0 (0)	0 (0)	1 (1)

Table 2. Frequency distribution of students' views regarding the rabies prevention unit visit

Item	Strongly agree n (%)	Somewhat agree n (%)	Slightly agree n (%)	Undecided n (%)	Slightly disagree n (%)	Somewhat disagree n (%)	Strongly disagree n (%)
It was very helpful and instructive for me to see a patient who was bitten by an animal up close who had come for the rabies vaccine.	82 (84.5)	13 (13.4)	0 (0)	2 (2.1)	0 (0)	0 (0)	0 (0)
Seeing how to wash the bitten wound and hearing the explanation of the expert during washing was very helpful and instructive for me	56 (57.7)	15 (15.5)	5 (5.2)	18 (18.6)	1 (1)	1 (1)	1 (1)
The experience of an expert in rabies prevention department about the indications of serum injection in bitten people was very helpful and instructive for me.	75 (77.3)	17 (17.5)	3 (3.1)	1 (1)	1 (1)	0 (0)	0 (0)
The experiences and explanations from the rabies prevention expert about how to follow the biting animals and the number of vaccination sessions needed was very helpful and instructive for me.	85 (87.2)	9 (9.3)	1 (1)	2 (2.1)	0 (0)	0 (0)	0 (0)
It was very helpful and instructive for me to see the refrigerator containing the serum and vaccine and how they are stored.	68 (70.1)	20 (20.6)	7 (7.2)	2 (2.1)	0 (0)	0 (0)	0 (0)
It was very helpful and instructive for me to see how to complete the software for registering animal-bitten patients and how to fill the relevant forms according to the national instructions of the Ministry of Health.	56 (57.7)	24 (24.7)	13 (13.4)	4 (4.1)	0 (0)	0 (0)	0 (0)
The explanations of the expert of rabies prevention unit about educating patients to receive the next dose of vaccine and the consequences of not visiting and following up the patients were very helpful and instructive for me.	83 (85.6)	9 (9.3)	2 (2.1)	2 (2.1)	1 (1)	0 (0)	0 (0)
Epidemiological interviews with rabies patients and their companions were very helpful and instructive for me.	65 (6.7)	19 (19.6)	9 (9.3)	4 (4.1)	0 (0)	0 (0)	0 (0)
The explanations by rabies prevention unit about rabies vaccination during non-business hours was very helpful and instructive for me.	75 (77.3)	14 (14.4)	4 (4.1)	4 (4.1)	0 (0)	0 (0)	0 (0)

Table 3. Frequency distribution of the student's view on brucellosis serology tests

Item	Strongly agree n (%)	Somewhat agree n (%)	Slightly agree n (%)	Undecided n (%)	Slightly disagree n (%)	Somewhat disagree n (%)	Strongly disagree n (%)
It was very helpful and instructive for me to see how a Wright serology test is done to diagnose malaria by a laboratory expert.	55 (56.7)	26 (26.8)	9 (9.3)	3 (3.1)	3 (3.1)	1 (1)	0 (0)
The observation and explanations of the laboratory expert on how to dilute the test tubes in Wright test were very helpful and instructive for me.	59 (60.8)	26 (26.8)	10 (10.3)	1 (1)	1 (1)	0 (0)	0 (0)
It was very useful and instructive for me to see the positive Wright agglutination and how to read and report it.	54 (55.7)	27 (27.8)	8 (8.2)	5 (5.2)	2 (2.1)	1 (1)	0 (0)
The experiences and explanations of the laboratory expert and instructor about 2ME diagnostic test and how to distinguish active Brucellosis from inactive one was very helpful and instructive for me.	55 (56.7)	24 (24.7)	7 (7.2)	5 (5.2)	4 (4.1)	1 (1)	1 (1)
The explanation of the laboratory expert and instructor about the effect of drug treatment on serological tests for Brucellosis was very helpful and instructive for me.	56 (57.7)	23 (23.7)	10 (10.3)	5 (5.2)	2 (2.1)	1 (1)	0 (0)

Table 4. Students' satisfaction percentages for the three departments in the healthcare center

Unit	Mean	SD
Leishmaniasis	93.38	11.80
Prevention of rabies	89.25	16.51
Brucellosis	82.69	20.77
Total satisfaction	92.61	11.87

Table 5. Mean ± SD of student satisfaction scores for each department

Unit	Mean ± SD	Scores range
Leishmaniasis	0.50 ± 6.72	3.78-7
Prevention of rabies	0.57 ± 6.57	3.56-7
Brucellosis	0.93 ± 6.28	2.60-7
Total satisfaction	0.51 ± 6.53	4.06-7

Table 6. Comparison of student satisfaction scores between continuous and discontinuous bachelor's students*

Unit	Satisfaction percentage of continuous students Mean ± SD	Satisfaction percentage of discontinuous Mean ± SD	P-value
Leishmaniasis	10.21 ± 91.55	13.00 ± 95.10	0.140
Prevention of rabies	18.16 ± 85.80	14.24 ± 92.50	0.047
Laboratory	22.50 ± 90.80	15.21 ± 90.80	0.001
Total satisfaction	11.9 ± 94.34	11.97 ± 94.34	0.135

*Differences between groups were analyzed using independent samples t-test. Significance level was set at 0.05

Pearson correlation analysis indicated no significant relationship between students' overall satisfaction scores and their grade point averages ($P > 0.05$). Additionally, the majority of students expressed a preference for this type of experiential learning over other topics in the course, particularly citing tuberculosis as a case they would like to study in a similar hands-on format.

Discussion

This study evaluated the impact of visits to the operational departments of the Gonbad-e-Kavous healthcare center on public health students' satisfaction with the achievement of course objectives. Overall, students reported high levels of satisfaction with this experiential learning approach, with the highest satisfaction observed in the Cutaneous Leishmaniasis (CL) department. The high satisfaction in the CL department likely reflects the students' opportunity to observe patients with various CL lesions and learn about treatment protocols, including local and systemic therapies and cryotherapy. Students were organized into small groups to examine different wounds and treatment procedures, observe sampling techniques, perform Giemsa staining, and identify Leishman bodies under the microscope. The combination of conventional classroom instruction with direct, hands-on observation provided a rich, immersive learning environment. This aligns with Edgar Dale's Cone of Experience, which emphasizes that direct, first-hand experiences significantly enhance learning retention (16). Similar findings have been reported by Sathishkumar et al., who observed that early clinical exposure improved medical students' understanding, memorization, and integration of physiological knowledge while fostering sensitivity toward patients (17). Likewise, Jefferson et al. found that field visits with Alzheimer's patients positively influenced students' attitudes and engagement with real-life patient care (18).

The rabies prevention and control department received the second-highest satisfaction ratings, comparable to the CL department. Some groups were not able to observe active patient care, which may have slightly limited the hands-on experience. Nevertheless, students learned wound care procedures, vaccination and rabies immune globulin administration, dosage calculation, and patient follow-up through observation and interactive discussions with department staff. According to educational research, approximately 75% of learning occurs through visual engagement, and experiences at the base of Dale's cone can achieve up to 90% retention of knowledge (16). The combination of observation, demonstration, and Q&A likely contributed to the high satisfaction reported.

Satisfaction with the Brucellosis serology laboratory, while slightly lower than the other departments, remained high. This may have been influenced by student fatigue, as the laboratory visit occurred at the end of the day. Nonetheless, exposure to real patient serum samples, stepwise preparation of dilutions, and interpretation of Wright, Coombs Wright, and 2ME tests helped students understand laboratory procedures and diagnostic protocols. Similar results were observed in the study by Taylor and Mann, where genetic counselors' clinical visits to a cancer center enhanced their understanding of patient care and increased their sense of responsibility and empathy (19).

Discontinuous bachelor's students reported significantly higher satisfaction than continuous students in the Brucellosis laboratory and rabies prevention departments. This difference may reflect the prior theoretical exposure of discontinuous students, who had encountered these topics in earlier courses but had not yet engaged with real-world applications. Interestingly, no significant correlation was observed between students' GPA and satisfaction scores, indicating that the visits were equally engaging and beneficial for students across the academic performance spectrum.

This study has several limitations. Its cross-sectional design and reliance on self-reported questionnaires limit the ability to infer causal relationships. Only three departments were visited in a single day, which may restrict generalizability. The study focused on student satisfaction rather than direct assessment of learning outcomes, preventing comparisons with previous cohorts who did not participate in the visits. Ambiguity in Likert scale descriptors, such as "somewhat" and "slightly," could have led to inconsistent interpretations by students. Regarding the questionnaire, while content validity was reviewed by three faculty experts, quantitative indices such as the Content Validity Index (CVI) and Content Validity Ratio (CVR) were not calculated, limiting objective evidence of item relevance. Additionally, the Cronbach's alpha for the rabies prevention subscale was relatively low (0.407), likely due to the small number of items and topic diversity. Despite this, the subscale was retained because it captured key aspects of students' satisfaction; however, findings related to this section should be interpreted with caution.

In summary, the findings support the value of community-based, experiential learning in public health education, demonstrating that direct engagement with operational healthcare departments enhances student satisfaction and reinforces understanding of real-world public health practices.

Conclusion

Students reported high satisfaction with this experiential learning approach, highlighting its effectiveness in enhancing engagement and understanding of public health practices. Extending similar field visits and scientific trips to other public health courses is recommended, particularly after addressing time constraints during visits. Given the positive perceptions observed, future studies should evaluate the impact of such visits on actual learning outcomes using rigorous designs, such as pre-test/post-test assessments with control groups.

Acknowledgement

The author would like to thank the Gonbad-e-Kavous health authorities for kindly providing access to the departments for the visits.

Funding sources

This study was funded by Golestan University of Medical Sciences.

Ethical statement

Formal ethical approval for this study was obtained from the Ethics Committee of Golestan University of Medical Sciences (IR.GOUMS.REC.1396.236). All procedures were conducted in accordance with relevant guidelines and regulations. Informed consent was obtained from all participants prior to their involvement in the study.

Conflicts of interest

The author declares that they have no competing interests.

Author contributions

All phases of the study were conducted by AC.

Data availability statement

The dataset is available upon request from the corresponding author.

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Cite this article as:

Charkazi A. Public health students' satisfaction and perceptions of a learning trip on rabies prevention, cutaneous leishmaniasis, and serological tests of brucellosis. *IJHMD*. 2025;X(X):X. http://dx.doi.org/10.29252/IJHMD.X.X.X