


RESEARCH ARTICLE

When patients should seek medical care for minor ailments: Perspectives of first- and final-year pharmacy students

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Abstract

Background: Universities are tasked with preparing students to assist the public in managing minor ailments. This study aimed to determine when pharmacy students would refer patients to medical care as an indicator of clinical skill. **Methods:** First- and final-year students from four schools were surveyed to determine referral timelines for 17 scenarios. Responders also quantified symptom severity and their confidence levels. **Results:** Students responding to at least three cases were kept for analysis (n = 117). First-year students considered nasal congestion to be low in severity, with painful urination and rectal bleeding deemed more serious, all while considering most cases more serious than upper-year students. Student confidence was generally lower in new students. Referral times showed similar patterns between years and universities. Red eye, painful urination, diarrhoea (child), and Gastro-Oesophageal Reflux Disease (GORD) (unhealthy patient) were referred quicker than nasal allergies and cough. Referrals typically stayed within a two-week window for most situations. **Conclusion:** Timelines for medical care were similar between years and institutions. As expected, new students assessed cases as more serious and had less confidence than their upper-year colleagues. A concern for the institutions might be the low rate of real-world case exposure within programmes.

Introduction

When people host common health problems like colds, allergies, red eyes, and gastrointestinal complaints, they will assess their situation and then may decide that a visit to a pharmacy for advice is a viable option. Pharmacists in most Western countries have a long history of helping the public manage minor ailments (International Pharmaceutical Federation, 2022), often involving over-the-counter (OTC) medicines. Their role can go beyond this form of treatment, extending to non-pharmacologic modalities, a wait-and-see approach, and/or referral to medical care.

Pharmacists must demonstrate their competence to justify this involvement. Some evidence points to suitable performance relative to minor ailment management (Bardage *et al.*, 2013; Watson *et al.*, 2015; Schimmelfing *et al.*, 2017; Tucker *et al.*, 2017; Langer *et al.*, 2018; Van Eikenhorst, Salema & Anderson, 2017). Educators/pharmacists at universities and in practice are tasked with preparing students for this role in community pharmacy.

Accreditation standards worldwide define the expectations for undergraduate pharmacy curricula. In the United States, the Nonprescription Medicines Academy has provided an overview of self-care education, with some sites presenting the material as

stand-alone, while others offer it as an elective or integrate it into existing therapeutics courses (Nonprescriptions Medicine Academy Steering Committee *et al.*, 2014). In Canada, one study found that all ten pharmacy schools in the country provided instruction on minor ailments. These institutions believed that their curriculum adequately prepared students to gather patient information, effectively triage them, and counsel patients on OTC medicine use (Nakhla *et al.*, 2021). There was a striking difference in content delivery, with compulsory coursework contact hours ranging from 13 to 91 hours. In one of these provinces, upper-year students assessed the educational focus needed for key areas of practice (Taylor *et al.*, 2022). Therapeutics and patient counselling received the highest rates in terms of needing more attention, followed by drug-related problems and OTC therapeutics.

Feedback on pharmacy curricula has been sought from various sources, extending beyond just OTC therapeutics (Singh, Morrissey & Ball, 2020). The American Association of Colleges of Pharmacy surveyed graduating students across the country and found that nearly 94 per cent agreed or strongly agreed they were prepared to enter pharmacy practice (American Association of Colleges of Pharmacy, 2019). Similarly, pharmacy graduates from a Swedish university expressed high levels of satisfaction with their programme, indicating that the knowledge and skills they acquired were valuable in their current roles, especially in community pharmacy (Gustafsson, Wallman & Mattsson, 2021).

This study aimed to determine the point in time when pharmacy students would refer patients (across various scenarios) to medical care as an indicator of their clinical skills. Students should know their competence limits to ensure patients receive appropriate and timely care. The study involved two cohorts: first- and final-year students. While it was not prospective throughout a programme, this approach enables some evaluation of the influence of student training. Four institutions were selected to identify critical differences that might signal quality assurance issues for educators to address.

Methods

To collect student input, a convenience sample was gathered consisting of colleagues who expressed interest at four pharmacy schools: the University of Saskatchewan in Canada (USask), Northeastern University in Boston (NU), USA, the University of Auckland in New Zealand (UAuck), and the University of Portsmouth in England (UPort). Two cohorts were chosen at each of these institutions – first-year students

(Y1) who were at the earliest point in their training and final-year students (Y4) who had completed their experiential rotations. In the case of the University of Auckland, students were in their second year (following a pre-pharmacy year) but were in their first year within the pharmacy programme and were considered equivalent to Y1 students for this report.

The number of students from each school were as follows: USask (Y1 = 90, Y4 = 81), UAuck (Y1 = 102, Y4 = 91), NU (Y1 = 93, Y4 = 133), UPort (Y1 = 102, Y4 = 72). Mailing lists were obtained from the respective pharmacy programmes using local contacts and/or Associate Deans of Undergraduate Affairs (or equivalent positions) to adhere to the specific requirements at each institution.

Ethical approval was obtained, with three institutions relying on the initial approval from the University of Saskatchewan (BEH #2612).

Students were contacted at four points, timed to align with each programme's term structure for Y1 and Y4 students: 1) An advance e-mail explained the nature of the survey; clarified why their year was chosen, and stressed that participation was voluntary; 2) The invite e-mail reiterated the intent, outlined student rights (and consent) as survey responders, and provided a link to the online survey; 3) The first reminder; and 4) The second reminder.

The survey closed four weeks after the initial contact. For example, if a programme started in September and ended in April, the first contact with Y1 students occurred within the first week of September, while the first contact with Y4 students was near the end of March. Students were informed that the survey was not connected to any course, did not offer academic credits, and that their responses would not be tracked. Thus, reminders went out to all students of a specific year, not just those who had not responded thus far.

Students who returned the survey (with at least three completed cases) were entered into a draw for a chance to win US\$50 as an incentive for their participation. Four prizes were awarded to Y1 students and four to Y4 students at each school.

The questionnaire focused on how students would approach various clinical situations. These scenarios encompassed 21 different cases, considering perspectives on when to seek medical care from the standpoints of patients, pharmacists, and physicians, as previously reported (Taylor, 2019; Taylor *et al.*, 2019). These cases were built around situations that varied in severity and body systems (Rennie, Porteous & Ryan, 2012; McAteer *et al.*, 2015). They were similar in content and length to those used in previous studies (Berger, Eickhoff & Schulz, 2005; Rennie, Porteous & Ryan, 2012;

Bardage *et al.*, 2013). Cases and survey items were piloted on three pharmacists, three physicians, and three adults at that time. For the current report, the number of cases was reduced to 17 to minimise the burden on responders. These cases ranged from nasal congestion to paediatric fever and haemorrhoids (Appendix A). Students were asked to respond to each case. These cases provided details related to patient treatment and co-morbidities and were presented online in a random order. Descriptor terms like “Case 5–Constipation” or “Case 14–GORD” were not included as case titles.

The questionnaire drew upon several key constructs, including symptom severity (serious), confidence in decision-making (Campbell *et al.*, 2005; Brabers *et al.*, 2013; Watson *et al.*, 2015), timelines for deciding when to consult a doctor (Campbell *et al.*, 2005; McAteer *et al.*, 2015), and a report with the same specific intent (Taylor, 2019). Questions posed for each case were as follows:

Q1. Practitioners have different views of HOW SERIOUS various symptoms can be. Please rate this situation on how serious you feel it currently is?

Students responded by quantifying their opinion on a 9-point Likert scale, with verbal anchors at five positions (1 = Not serious, 3 = Slightly serious, 5 = Somewhat serious, 7 = Serious, and 9 = Very serious).

Q2. How confident are you in your ability to know WHEN this person should see a physician for this situation?

Students indicated their opinion on a 9-point Likert scale, with verbal anchors at five positions (1 = Not confident, 3 = Slightly confident, 5 = Somewhat confident, 7 = Confident, and 9 = Very confident).

Q3. IF the symptoms persist, at the same intensity, when should this woman/man/child see a physician?

Students were able to choose from the following options: 1) Don't wait – see MD right away; 2) See MD in a couple of days; 3) See MD in a week; 4) See MD in two weeks; 5) See MD in four weeks; 6) See MD in MORE than four weeks (with a request to indicate how many weeks); and 7) As long as his/her overall health does not change, there would be no real need to see a physician in the foreseeable future.

Final-year students were asked two additional questions: (Q4) whether they had received training on this topic during their pharmacy programme and (Q5) whether they had encountered similar cases while working or training in a community pharmacy. Options were YES, NO, CAN NOT REMEMBER.

Results

Students responding to at least three cases were kept for analysis ($n = 117$). Accordingly, the response rates per site were: USask 29.2%, UAuck 14.5%, NU 8.8%, and UPort 10.9%. Regarding the year of study, 62 students were new to their programme, while 55 were in their final year (Table I). Of those indicating gender ($n = 116$), 78.4% were female, and 21.6% were male; one participant preferred not to disclose.

Table I: Demographics

	USask	NU	UAuck	UPort
Year in programme				
First year	26	11	13	12
Final year	24	9	15	7
Gender				
Female	40	16	19	16
Male	10	4	8	3

Students were asked to rate the perceived severity of each case on a 9-point scale (Table II).

Y1 students perceived nasal congestion as the least severe condition in three out of four schools, and it was the second least severe condition in NU. Painful urination or rectal bleeding received the highest severity ratings among Y1 students. For Y4 students, nasal congestion was also the least or second least severe condition, while rectal bleeding, painful urination, or GORD (in an unhealthy patient) scored the highest. In general, Y1 students perceived most situations as more severe than their Y4 counterparts. For example, Y1 UAuck students rated headaches three points higher than their Y4 colleagues. However, there was less discrepancy in some cases, such as nasal congestion, where the difference was only 0.5 points among UPort students.

Student confidence was generally lower in Y1 students, except at UPort, where Y1 confidence was higher in 16 of 17 situations (Table III). The number of Y4 students who rated their confidence at 6.0 or more was 14 (USask), 12 (NU), 15 (UAuck), and 3 (UPort). The lowest levels of confidence in Y4 students were seen in skin rash (USask and UPort), haemorrhoids (NU), and low back pain (UAuck). At one institution (NU), the confidence of Y1 students ranged from 4.7 (constipation) to 6.7 (heartburn), while that of their Y4 counterparts ranged from 4.7 (haemorrhoids) to 7.9 (painful urination). Painful urination ranked highest in terms of confidence across all Y4 students.

Table II: Student perception of case severity (mean scores*)

Case #	USask		NU		UAuck		UPort	
	Y1	Y4	Y1	Y4	Y1	Y4	Y1	Y4
1 Nasal congestion	1.7	2.0	2.8	2.0	2.8	1.7	1.8	1.3
2 Red eye	4.3	3.0	5.4	4.1	5.6	3.6	6.3	4.3
3 Sore on lip	3.6	2.3	4.3	2.7	4.7	3.3	4.4	3.0
4 Diarrhoea–adult	3.5	4.6	4.6	5.7	4.6	3.4	2.9	3.7
5 Constipation	3.9	3.1	4.9	3.1	4.1	4.5	3.3	2.7
6 Painful urination	5.2	4.1	6.4	6.0	5.8	4.6	4.0	5.8
7 Headache	4.0	2.7	3.8	2.9	5.5	2.4	5.4	2.8
8 Fever	4.6	4.4	5.2	5.0	5.1	3.9	5.8	4.3
9 Diarrhoea–child	4.6	5.2	6.2	5.6	5.1	4.3	5.7	4.3
10 Low back pain	4.2	3.7	4.6	4.0	4.9	4.5	4.1	4.7
11 Heartburn	2.8	2.6	2.6	1.9	4.5	3.2	3.3	3.1
12 Rectal bleeding	5.0	4.9	4.7	5.0	5.0	4.2	7.9	4.2
13 Allergic symptoms	2.8	2.6	2.6	2.0	3.0	2.7	4.2	1.9
14 GORD (Gastro-oesophageal reflux disease)	5.2	4.0	4.6	4.8	5.6	5.5	6.6	5.0
15 Haemorrhoids	4.2	3.0	4.8	3.6	5.5	2.7	5.6	3.8
16 Cough	3.2	2.7	4.8	2.6	4.4	2.2	4.5	1.5
17 Skin rash	2.5	3.8	2.9	2.7	3.3	3.9	3.3	3.5

* Scale: 1 (not serious) / 2 / 3 (slightly serious) / 4 / 5 (somewhat serious) / 6 / 7 (serious) / 8 / 9 (very serious)

Table III: Student confidence to manage the case (mean scores*)

Case #	USask		NU		UAuck		UPort	
	Y1	Y4	Y1	Y4	Y1	Y4	Y1	Y4
1 Nasal congestion	5.6	7.3	6.0	6.3	6.0	7.1	7.3	6.0
2 Red eye	4.8	7.0	5.5	6.0	7.0	7.1	6.2	5.3
3 Sore on lip	4.1	7.8	6.0	5.1	4.4	6.9	5.6	5.5
4 Diarrhoea–adult	4.4	6.5	6.0	6.0	5.8	6.9	7.1	5.0
5 Constipation	3.9	6.8	4.7	5.9	5.7	6.2	6.1	4.3
6 Painful urination	6.0	7.9	6.0	7.9	6.5	7.6	7.4	6.7
7 Headache	4.5	6.5	5.3	6.1	5.1	6.4	7.0	5.2
8 Fever	5.3	6.5	5.1	6.2	6.4	6.5	7.9	4.8
9 Diarrhoea–child	4.7	5.8	5.7	5.6	6.3	6.7	7.4	4.0
10 Low back pain	4.2	5.8	5.3	5.3	5.7	4.7	6.9	4.3
11 Heartburn	5.5	7.3	6.7	6.3	6.0	7.0	6.5	5.6
12 Rectal bleeding	4.9	6.7	4.9	6.1	5.3	7.0	7.9	4.5
13 Allergic symptoms	5.9	7.3	6.4	6.8	6.6	7.3	6.4	6.6
14 GORD (Gastro-oesophageal reflux disease)	4.5	6.5	5.7	7.2	6.1	6.6	7.4	5.5
15 Haemorrhoids	4.4	6.9	5.4	4.7	6.1	6.3	7.4	4.8
16 Cough	4.8	6.9	5.2	7.3	5.7	6.6	7.1	5.8
17 Skin rash	4.7	5.3	5.3	6.1	6.3	5.8	7.0	3.7

* Scale: 1 (not serious) / 2 / 3 (slightly serious) / 4 / 5 (somewhat serious) / 6 / 7 (serious) / 8 / 9 (very serious)

The patterns regarding when to seek help from a physician were relatively similar between years and across universities (Table IV). A substantial number from both groups believed that headaches, heartburn, and nasal allergies might not require medical care if the symptoms remained at their current level. Nevertheless, both groups considered red eye, painful urination, diarrhoea (in a child), and GORD (in an unhealthy patient) to necessitate

quicker referral than nasal congestion, cough, and nasal allergies. Referrals typically fell within a two-week window for most situations across both years. Ten students selected nasal congestion, and another ten picked constipation as conditions not requiring medical care if there was no change in symptomatology in the foreseeable future. Bolded numbers in the table represent the most common choice for respective years.

Table IV: When to seek medical care (universities combined)

Case #	Right away		Few days		1 week		2 weeks		4 weeks		>4 weeks		No need	
	Y1	Y4	Y1	Y4	Y1	Y4	Y1	Y4	Y1	Y4	Y1	Y4	Y1	Y4
1 Nasal congestion	1	0	8	4	11	9	17	14	5	8	0	1	6	10
2 Red eye	25	18	24	11	5	9	0	4	1	1	0	0	1	0
3 Sore on lip	10	7	14	4	15	14	9	17	2	0	1	0	7	5
4 Diarrhoea–adult	8	9	29	33	12	5	5	0	1	0	0	0	0	0
5 Constipation	10	9	12	3	10	7	8	8	7	4	0	1	3	10
6 Painful urination	27	31	16	5	5	4	2	0	1	0	0	0	0	1
7 Headache	13	5	8	2	0	2	3	3	8	2	0	1	17	31
8 Fever	18	6	22	32	9	3	2	2	0	0	0	0	0	0
9 Diarrhoea–child	21	19	22	27	9	2	0	0	0	0	0	0	0	0
10 Low back pain	22	14	6	7	8	8	5	3	5	1	0	0	5	5
11 Heartburn	9	5	1	3	9	3	3	4	5	5	1	1	24	27
12 Rectal bleeding	27	22	11	8	5	10	7	2	1	3	0	1	1	1
13 Allergy symptoms	8	2	6	7	6	3	8	6	3	5	0	0	21	18
14 GORD	22	15	12	11	8	4	4	7	5	3	0	0	2	3
15 Haemorrhoids	19	5	14	8	13	21	6	6	1	2	0	0	1	2
16 Cough	4	0	17	10	16	6	16	15	3	13	0	0	0	3
17 Skin rash	2	5	19	17	18	17	8	4	4	0	0	0	1	0

Final-year students used YES, NO, or can not remember (CNR) to indicate whether their pharmacy programme covered the topic (Table V). They were also asked whether they had encountered similar cases in their university-based courses/rotations and/or when

working at a community pharmacy, although employment status was not requested (Table VI). Table VII presents the official list of topics taught in each programme.

Table V: Students reporting topic was covered (Y4 students)

Case #	U Sask			NU			UAuck			UPort		
	Yes	No	CNR*	Yes	No	CNR	Yes	No	CNR	Yes	No	CNR
1 Nasal congestion	20	0	1	6	0	1	13	0	0	5	0	1
2 Red eye	20	0	1	6	0	1	12	0	1	3	0	3
3 Sore on lip	21	0	0	5	2	0	12	1	0	5	0	1
4 Diarrhoea–adult	19	1	1	7	0	0	14	0	0	4	2	0
5 Constipation	20	0	0	7	0	0	12	0	1	3	1	2
6 Painful urination	21	0	0	7	0	0	14	0	0	6	0	0
7 Headache	20	0	0	5	2	1	13	1	0	6	0	0
8 Fever	19	0	0	4	0	2	13	0	0	3	1	2
9 Diarrhoea–child	20	0	1	5	1	1	13	0	1	2	0	4
10 Low back pain	17	0	2	2	2	2	6	1	6	4	1	2
11 Heartburn	20	0	1	7	0	1	12	0	1	6	1	0
12 Rectal bleeding	18	2	0	5	2	1	13	0	0	2	1	3
13 Allergy symptoms	20	0	0	7	0	1	13	0	0	7	0	0
14 GORD (Gastro-oesophageal reflux disease)	18	1	1	5	0	1	13	0	0	5	0	1
15 Haemorrhoids	20	0	0	3	2	2	12	0	1	2	2	2
16 Cough	20	0	1	4	1	2	12	0	2	4	0	2
17 Skin rash	18	2	1	5	0	2	5	1	5	5	0	1

* can not remember

Table VI: Situation has been encountered in practice (Y4 students)

Case #	U Sask			NU			UAuck			UPort		
	Yes	No	CNR*	Yes	No	CNR	Yes	No	CNR	Yes	No	CNR
1 Nasal congestion	17	2	2	4	3	0	8	3	2	2	3	1
2 Red eye	17	3	1	2	5	0	7	5	1	3	3	0
3 Sore on lip	17	3	1	1	6	0	7	6	0	2	4	0
4 Diarrhoea–adult	13	7	1	1	6	0	2	10	2	3	3	0
5 Constipation	18	2	0	2	3	2	3	10	0	3	3	0
6 Painful urination	19	2	0	3	4	0	7	7	0	3	3	0
7 Headache	11	9	0	2	5	1	5	9	0	2	3	1
8 Fever	12	4	3	1	4	1	6	5	2	2	4	0
9 Diarrhoea–child	11	10	0	5	0	2	6	6	2	2	4	0
10 Low back pain	10	7	2	1	4	1	1	10	2	2	4	1
11 Heartburn	13	4	4	4	4	0	7	5	1	3	4	0
12 Rectal bleeding	10	9	1	2	6	0	5	8	0	1	4	1
13 Allergy symptoms	14	5	1	5	3	0	9	4	0	3	4	0
14 GORD (GORD = Gastro-oesophageal reflux disease)	12	7	1	2	3	1	3	8	2	2	3	1
15 Haemorrhoids	10	9	1	2	4	1	4	7	2	2	3	1
16 Cough	15	4	2	2	5	0	7	6	1	3	3	0
17 Skin rash	11	7	3	3	4	0	2	6	3	2	4	0

* can not remember

Table VII: Topics officially covered in programmes

Case #	USask	NU	UAuck	UPort
1 Head colds	X	X	X	X
2 Conjunctivitis	X	–	X	X
3 Cold sores	X	–	X	X
4 Diarrhoea–adult	X	X	X	X
5 Constipation	X	X	X	X
6 UTIs	X	X	X	X
7 Tension headache	X	X	X	X
8 Fever	X	X	X	–
9 Diarrhoea–child	X	X	X	X
10 Low back pain	X	–	X	X
11 Heartburn	X	X	X	X
12 Rectal bleeding	X	–	X	X
13 Allergic rhinitis	X	X	X	X
14 GORD	X	X	X	X
15 Haemorrhoids	X	–	X	–
16 Bronchitis	X	X	X	X
17 Hives	X	–	–	X

x = covered in the academic programme

GORD = Gastro-oesophageal reflux disease

The vast majority reported that the 17 topics had been covered. However, two USask students (one NO and one CNR) responded negatively to GORD within their programme, two voted the same for diarrhoea, and one student could not remember whether nasal

congestion was covered. Over half of UAuck students voted NO or CNR for low back pain, and four out of six UPort students chose CNR for paediatric diarrhoea.

A relatively high number of students reported they had not seen, or could not remember seeing, similar cases in their practice settings. At USask, almost half of the students had not seen cases of paediatric diarrhoea, while a considerable portion had not come across cough (six out of 21) or headache (nine out of 20) cases. At UAuck, 10 of 13 had not seen cases of low back pain, while at NU, four out of eight students had not run across heartburn cases. Overall, across 17 situations and four schools, the percentage of students reporting they had not seen such cases during actual patient encounters, or could not remember as much, were: 33.7% (USask), 65.0% (NU), 39.7% (UAuck), and 38.1% (UPort).

Discussion

It is vital to develop within a pharmacy programme skills to safely and effectively manage minor ailments. Institutions would devote didactic material and practice lab time to meet this outcome, with varying amounts of each between programmes. Then, experiential training would expose students to actual patient cases, further enhancing their skills (Aly *et al.*, 2020).

When assessing the appropriateness of care, one critical component is the point in time when a patient should consult a physician/nurse practitioner. While some guidance is available on the internet, it is essential to recognise that patients must avoid delays in medical care, depending on the case and its complexity. For example, the Mayo Clinic suggests that a patient with bronchitis (case 16) should see a doctor if a cough lasts more than three weeks (Mayo Clinic, 2023). Another site advises parents to seek medical care for a child with diarrhoea (case 9) if diarrhoea does not improve after several days (Gavin, 2021). The Cleveland Clinic lists several red flags for constipation and recommends seeking help if it has lasted more than three weeks (Cleveland Clinic, 2023). In a university setting, educators may not be able to always provide the exact number of days/weeks/months for seeking medical care due to the varied intricacies from one case to another. Nevertheless, once the details of a case are known, educators can offer more tailored guidance on when to seek medical attention.

For the current report, two cohorts of students representing different stages in their pharmacy education provided input on when they would refer a patient in various conditions. Including new students served as a baseline, as their perspectives are assumed to reflect more those of the general public when responding to diverse medical situations. However, despite being new to pharmacy, these students would likely be more educated than average patients. Nevertheless, their input provided a counterpoint to the feedback of final-year students.

The assessment revealed that Y1 students generally regarded the majority of cases as more serious than their Y4 counterparts. However, there were also similarities; both groups rated nasal congestion as a less severe ailment, while painful urination and rectal bleeding scored higher in severity. In the latter case, Y4 students might recognise rectal bleeding as a potential anal fissure, which can be minor, whereas Y1 students may be less experienced in making such assessments. For a broader comparison, the public rated head colds as the least severe (within a set of 21 situations) at 1.7, followed by coughs and cold sores at 2.7. In contrast, rectal bleeding received a severity score of 5.6, and painful urination scored 5.5 among laypersons (Taylor et al., 2019).

Expectedly, student confidence in managing the cases was higher among Y4 students. However, concluding that confidence consistently increases as students move from Y1 to Y4 is not possible, as these cohorts were not followed over time. Nevertheless, the fact that a majority of Y4 students rated their confidence at 6.0 or higher was a positive sign, considering that a

score of 5.0 corresponded to being somewhat confident. This finding raises a question as to the level Y4 students should ideally attain? Should educators aim for a 7.0 (confident) during this self-reflection, or should students feel very confident (9.0) in dealing with most of the situations? However, with very confident standing at the polar extreme of the 9-point scale, it might be unlikely for anyone to select this option.

Except for reports where students stated they were prepared to practice (AAP, 2019; Gustafsson, Wallman & Mattsson, 2021), there are not many precedents for these findings, nor as many specific topics. On the same issue, data regarding the general population are limited. In one report, members of the public indicated their confidence in determining when one should seek medical care for the same cases, and it was lowest for low back pain, headache, and constipation, all being around 5 (somewhat confident) on the same 9-point scale (Taylor et al., 2019). Of note, the scenario presented as a likely UTI in the current study received the highest rating of confidence among Y4 students at each location. This result might be due to the clearer-cut approach to UTIs in guidelines, whereas dealing with chronic constipation or an acute cough can be more speculative.

The patterns of when to seek medical care were relatively similar between years. Symptoms such as red eye, painful urination, paediatric diarrhoea, and GORD (in unhealthy patients) were identified by both groups as requiring quicker referral than what could be best described as head/chest colds or seasonal allergies. Referrals typically fell within a two-week window for most situations. For Y1 students, this result is perhaps reflective of some 'common sense' in understanding how to deal with minor health issues, some of which would likely have been experienced by them (head colds, coughs, cold sores, headaches, heartburn). Outliers such as one Y4 student believing that consistent UTI symptoms would not need medical care or five students feeling the same for GORD patients with other medical issues were more problematic.

Conversely, were some students overly cautious? Seeing a doctor too soon (or at all) also has drawbacks for the healthcare system. To that end, many countries promote self-care for a range of common ailments (Global Self-Care Federation, 2022). Interestingly, none of the Y4 students suggested that a young, healthy adult with a suspected head cold should seek immediate medical care, while only one Y1 did. However, five Y4 students recommended medical care for episodic heartburn, which was food-induced, had no red flags, and showed some relief with OTC medicines.

Regarding the timing for referrals, there are few precedents in the literature. In one report that explored this issue for head cold symptoms that do not clear up, 60.4% of pharmacists stated referring at the one- or two-week point (Taylor, 2019). Physicians were more likely to prefer medical care for a red eye than assessments made by pharmacists, with 85.7% of physicians suggesting seeking care right away or after a few more days versus 63.2% of pharmacists doing the same. Regarding diarrhoea in an adult, most pharmacists (83.0%) and physicians (84.6%) recommended seeking a referral right away or after a few more days. When the diarrhoea involved a child, somewhat more pharmacists (95.6%) than physicians (88.9%) indicated that care was needed within that same time frame. Both groups considered that urinary symptoms require prompt medical care, with 88.6% of pharmacists and 81.8% of physicians recommending seeking care right away or after a few more days.

When comparing the approach of pharmacists to that of Y4 students, referral timelines for a red eye were remarkably similar, where 67.4% of Y4 students would refer such a case either right away or within a few days, while 63.2% of pharmacists would do the same (Taylor, 2019). For a head cold, the modal response was two weeks for both groups, again showing some consistency.

From the patient's perspective, a report from the UK found that people considered a persistent cold to be one lasting four to seven days, after which a physician should be consulted (Moss & Kennedy, 2002). Although dated, a study in Canada revealed that about half of the participants deemed persisting symptoms to mean longer than seven days (Vingilis, Brown & Hennen, 1999). On a worrisome note, 18% of patients with rectal bleeding waited more than a month before seeking medical advice (Courtney *et al.*, 2012). Nearly 50% of participants in another report disagreed that rectal bleeding lasting three weeks should get medical attention (Oberoi *et al.*, 2016).

When examining curriculum and teaching quality assurance, response rates were very low, and it is also possible that those who responded may have been academically stronger or more confident students. With those provisos, there did not seem to be any issue across the four institutions that might require attention at any one location. However, lower Y4 student confidence at UPort was evident, possibly because these students were more realistic in assessing their abilities, or it could be that new students to the programme have more competencies than elsewhere.

From the perspective of all four institutions, the low number of actual case experiences for students at the final stage of their education is a matter of concern.

Across 17 situations, one-third of students reported they had not seen such cases during real-patient encounters (or could not remember as much) at three of the four locations, with the fourth having double this percentage. This result requires an examination of the mix of cases that students encounter during rotations. Two Y4 USask students could not remember whether GORD was covered in their programme, three voted the same way for diarrhoea, and one student could not remember whether head colds were covered, with these three topics being among the more prominent minor ailment content in their programme. A possible explanation is that these topics are typically taught in the first year, and students might have forgotten details over time. Furthermore, rectal bleeding is covered as part of the differential diagnosis for haemorrhoids and anal fissures versus colorectal cancer within the USask programme. The amount of time spent on bleeding dynamics is about five minutes in total, so expectations for full recall three years later should be low.

Students have rarely been assessed, but mystery shopper studies have looked at pharmacist referral rates (Berger, Eickhoff & Schulz, 2005; Marklund *et al.*, 2003; Benrimoj *et al.*, 2008; Driesen & Vandenplas, 2009). In Australia, actors visited pharmacies for scenarios involving asthma, dyspepsia, and diarrhoea, where referral was appropriately made in 66% of the visits (Collins *et al.*, 2017). A Canadian report looked at referral practices of pharmacists for a host of ailments (Taylor & Mansell, 2016). For dysmenorrhoea, about one-third of pharmacists estimated they referred less than 10% of cases to medical care. Most pharmacists never referred cold sores to medical care, or did so less than 10% of the time. Migraine and bacterial conjunctivitis had higher referral rates.

Limitations

Limitations of the report are that more confident students may have completed it. Low response rates indicate that the results may not be generalisable to other students within their respective institutions or other programmes. Any calculations using an average score will have more influence from USask students due to higher student numbers. Data on programme content relied on student recall. An attempt to gather data with questionnaire items and 9-point scales has all the typical limitations in survey research, such as distilling complex behaviours into numerical format, concerns for validity, and whether the results are reliable. In real-world settings, OTC medicines may have been utilised to a greater extent than what was described in the case wording.

Conclusion

This study aimed to evaluate one aspect of minor ailment management, specifically case referral timelines. It provided insights from four different institutions, offering an opportunity to assess performance across various approaches. Surprisingly, the timelines for seeking medical care had relatively similar patterns between study years. As expected, new students tended to perceive cases as more severe and reported less confidence than their upper-year counterparts. Regarding quality assurance, no significant red flags were identified at either institution, although the low exposure to real-world cases at all four universities could be a concern worth addressing.

Conflict of interest

The authors report no conflicts of interest, either perceived or real, for the work conducted.

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Appendix A: Case descriptions

Case 1 Nasal congestion – A woman has had nasal symptoms (runny nose and congestion) for 3 days. She is 30 years old. She is sneezing a bit too. Her throat is a bit dry and scratchy. She is not coughing, however. She does not have a fever, nor any other symptoms. This person is otherwise in good health. In spite of taking what might be available over-the-counter (OTC) in pharmacies for relief, IF these symptoms **persist**, at the **same intensity**, when should this woman see a physician?

Case 2 Red eye – ONE eye of a child is quite bloodshot. He is 3 years old. It is not painful, nor itchy, but there is some mucous discharge along with the redness. He does not have a fever, nor swollen glands. He has had this for 2 days. On the 2nd morning, the eyelids of this one eye were a bit sticky upon waking. He has NO other symptoms, but had a head cold last week. Otherwise, the child is in good health. He has NOT been given medicine for this. IF these symptoms **persist**, at the **same intensity**, when should this child see a physician?

Case 3 Sore on lip – A man has a sore on his lower lip. He is 30 years old. It is about the size of an eraser on a pencil. The sore has been present for 3 days. Some tingling occurred in the same spot a day before it appeared. It is tender to touch, with some mild itch. There are tiny little blisters within the sore. He has NO other symptoms. He has never had this before. Otherwise, he is in good health. He got a bit of relief from an OTC product found in a pharmacy. Regardless, IF this sore **persists**, at the **same intensity**, when should this man see a physician?

Case 4 Diarrhea (Adult) – A woman has diarrhea. She is 30 years old. She has had it for the last 24 hours and has been to the toilet 5 times. She is experiencing mild cramps in her abdomen. She has a slight fever. She is not nauseated, nor is she throwing up. She does not have much of an appetite, but has been drinking fluids. She has NO other symptoms. She can not really think of a cause for this. This person is otherwise in good health. In spite of taking what might be available OTC in pharmacies for relief, IF these symptoms **persist**, at the **same intensity**, when should this woman see a physician?

Case 5 Constipation – A woman feels she may be constipated. She is 60 years old. Her usual bathroom habit was 1 bowel movement DAILY (for as long as she can remember). This gradually changed (over 1 year) to a bowel movement EVERY SECOND DAY. Now it happens with some straining and a lumpy stool that sinks. Sometimes when she does pass a stool, she feels like ‘it did not all get out’. She is NOT in any real discomfort during the day. There is some cramping, but no pain. There is NO fever and NO nausea. She has NO other symptoms. This situation has been present for a year. There were no changes in foods back then. Her stress level is the same. No new medicines have been added. About 6 months ago, however, she added more bran and fluid to her diet in hopes it would help, but nothing much has changed. This person is otherwise in good health. She gets some relief from OTC products found in pharmacies. Regardless, IF these symptoms **persist**, at the **same intensity**, when should this woman see a physician?

Case 6 Painful urination – A woman gets a burning sensation when she pees. She is 30 years old. This has been a problem for 2 days. She also has to pee more often than normal for her. A few times, the urge to pee came on quite quickly. Instead of her urine being clear and light yellow, it is now somewhat cloudy. She has NO other symptoms. This is her first time with these symptoms. Otherwise, she is in good health. She does not plan to try any OTC products found in pharmacies for this. IF these symptoms **persist**, at the **same intensity**, when should this woman see a physician?

Case 7 Headache – A man gets headaches about 2 times a month. He is 30 years old. This has been a problem since he was a teenager. They affect both sides of his head and he describes them as mild. There is dull pressure and a tightening sensation at the back of his head when one occurs. Each episode lasts about 2 hours. Afterwards, he is totally fine. They can happen anytime and don’t seem to be caused by any particular thing. He has NO other symptoms. Otherwise, he is in good health. He uses OTC products like Advil and Tylenol for them and they seem to work fine. Regardless, IF the headaches continue to occur in the same pattern, when should this man see a physician?

Case 8 Fever – A child has a fever. He is 3 years old. The fever has been present for 1 day. His temperature is 39°C (taken with an oral thermometer). The child also has a headache and his nose is runny (started at same time as fever). There is no cough. He has NO other symptoms. Otherwise, he is in good health. In spite of taking what might be available OTC in pharmacies for relief, IF these symptoms **persist**, at the **same intensity**, when should this child see a physician?

Case 9 Diarrhea (Child) – A child has diarrhea. She is 3 years old. She has had it for the last 24 hours and has been to the toilet 5 times. She is experiencing mild cramps in her abdomen. She has a slight fever. She is not nauseated, nor is she throwing up. She does not have much of an appetite, but has been drinking fluids. She has NO other symptoms. Her parents can not really think of a cause for this. This child is otherwise in good health. She has been given no medicine for this. IF these symptoms **persist**, at the **same intensity**, when should this child see a physician?

Case 10 Low back pain – A woman has pain in her lower back at times. She is 60 years old. It happens about 4 times a month. Each episode lasts about 2 days. When it happens, she describes the pain as mild. It is generally a dull sensation. But a few times in a day, there can be a sharp stab for a few seconds. The pain mostly occurs when bending over to pick something up. She is fine when resting in a chair or lying down. During these 2 days, her back does stiffen up. She has had this for about 10 years. She has never seen a physician for it. She can not think of an obvious cause – there have not been any falls, nor awkward twists. She has NO other symptoms. Otherwise, she is in good health. She uses OTC medicines like Advil and Tylenol for the pain, but they are little help. Either way, IF the back pain continues to occur in the same pattern, when should this woman see a physician?

Case 11 Heartburn – A woman gets heartburn about twice a month. She is 30 years old. This generally occurs after spicy foods or when she eats more at a meal than normal. When it does occur, her stomach contents burp up a bit into her throat. This leaves an acidic taste in the back of her mouth. That last about an hour, then goes away. She does not get a sore throat from this, nor is it ever difficult to swallow. She never notices any stomach pain. She has NO other symptoms. This has been happening for about 5 years. She has never asked a physician about this. Otherwise, she is in good health. She uses various medicines available OTC in pharmacies, and they are of some help. Regardless, IF the heartburn continues to occur in the same pattern, when should this woman see a physician?

Case 12 Rectal bleeding – A man recently noticed small streaks of blood every time he has a bowel movement. He is 60 years old. This began 3 days ago. The blood is bright red. It appears on both the stool and toilet paper (after wiping). The amount of blood being passed has remained the same – small streaks. He is not having more BMs than usual (still once a day). They have not changed in appearance, nor are they painful. He does not have a fever. He has NO other symptoms. He has never had a problem with hemorrhoids. This person feels fine and is otherwise in good health. He does NOT plan to try any OTC products found in pharmacies. IF these symptoms **persist**, at the **same intensity**, when should this man see a physician?

Case 13 Allergy symptoms – During the summer months, a woman has a very runny nose on most days. She is 30 years old. She also sneezes many times in a day. Her nose can get congested (blocked). Both her eyes and nose get itchy. All this is worse on windy days. On more troublesome days, getting her chores done is more difficult. The symptoms can keep her up at night. She has NO other symptoms. This has occurred since she was 10 years old. She has never seen a physician for it. Otherwise, she is in good health. She uses various products available OTC in pharmacies, and they are of some help. Regardless, IF these symptoms **persist**, at the **same intensity**, when should this woman see a physician?

Case 14 GERD – A man gets heartburn 4 times a week. This has been happening for about 3 months. He is 40 years old. Each episode lasts about 40 minutes, then goes away. During that time, he gets an acidic taste in the back of his mouth, especially when he burps. Sometimes it can be caused by certain foods. Other times there is no apparent reason. But, it is more common when he is lying down. He has never noticed any stomach pain from it. He has NO other symptoms. He has never asked a physician about this. He has other health problems. He is about 30 pounds overweight. He is out-of-shape and does not get a lot of exercise. He has high blood pressure, some diabetes, and arthritis, all treated with medicines. He uses various medicines available OTC in pharmacies, and they are of some help. Regardless, IF these symptoms **persist**, at the **same intensity**, when should this man see a physician?

Case 15 Hemorrhoids – A man suspects he has hemorrhoids. He is 30 years old. There is a small lump (or bulge) in his anal region. It feels to be about the size of a small grape cut in half. He notices this when he wipes his bum. This has been a problem for 3 days. There is some pain and discomfort during the day and during a bowel movement. He also has some itching in this same area for most of the day. He gets some relief when he can lie down (as opposed to standing). He has NO other symptoms. This person is otherwise in good health. He does NOT plan to try any OTC medicines found in pharmacies. IF these symptoms **persist**, at the **same intensity**, when should this man see a physician?

Case 16 Cough – A woman has been coughing for 2 days. She is 30 years old. The cough was dry and raspy for a day, but now ‘stuff’ comes up when she coughs. It is keeping her up at night. She had head cold symptoms for a day before the cough started. She does not have a fever, nor any body aches. She has NO other symptoms. This person is otherwise in good health. In spite of taking what might be available OTC in pharmacies for relief, IF these symptoms **persist**, at the **same intensity**, when should this woman see a physician?

Case 17 Skin rash – A man has a rash on his right shoulder. He is 30 years old. The rash has been there for 12 hours. It is very itchy. There are small bumps along with the redness. There is no oozing, no pus, no blisters. It is not painful. He can not recall doing or using anything new of late. He has no other symptoms. Otherwise, he is in good health. He does NOT plan to try any OTC medicines found in pharmacies. IF these symptoms **persist**, at the **same intensity**, when should this man see a physician?