

Building Community and Medical School Partnerships: Impact on Undergraduate Medical Education and Research

Samal Nauhria (✉ samalnauhria@gmail.com)

St. Matthew's University

Irene Derksen

St. Matthew's University

Shreya Nauhria

University of Leicester

Amitabha Basu

St. Matthew's University

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Abstract

Background: Community service provides avenues for social learning in medical education. Partnerships between medical schools and local healthcare agencies has paved the path for an active participation of a medical student in the community. This seems to have a positive impact on the medical knowledge and skills of students and also leads to a betterment of healthcare services for the community. National accreditation agencies and medical boards have emphasized that medical schools should provide opportunities for such learning to occur in the medical school curriculum. Various medical schools around the globe have adopted this active learning pedagogy and thus we wanted to explore how we can establish such a learning framework at our university.

Methods: This was a qualitative study based on feedback from volunteer students who attended the annual health fair conducted in collaboration with local healthcare agencies. Two focus group interviews were recorded, transcribed and coded for thematic analyses.

Results: Overall, the students enjoyed learning various clinical procedural skills. This activity was an opportunity to apply the medical knowledge learnt in classrooms. The students developed various competencies like communication skills, professionalism, team work and social responsibility. Prevalent health conditions discovered by the students included diabetes mellitus, hypertension and nutritional imbalance.

Conclusions: This study explores how serving the community can bring about an educational change for a medical student. The community service framework promotes social learning, interprofessional education, peer learning and active learning amongst medical students.

Background

Academic partnerships between medical schools and community healthcare providers for authentic learning have become a major focus of medical education (1–3). The element 6.6 by the Liaison Committee on Medical Education (LCME) recommends inclusion of community service learning (CSL) opportunities in medical teaching curriculum. It states that the medical schools should provide avenues for student participation in CSL (4).

Community-academic partnerships are commonly developed as a means to engage medical students in community service-learning (CSL) experiences with an emphasis on student outcomes (5–7). A close relationship between the community and medical schools is both a necessary antecedent to service learning with positive and valuable outcomes in medical education and public health (1, 3, 8–11).

Various authors have highlighted the beneficial outcomes of CSL including active learning opportunities along with feedback from senior colleagues or nurses, identity formation of a student, increased levels of motivation and better skill development (8, 12, 13). However, due to a lack of structure for identification

and measurement of outcomes, the benefit of such program in medical education is largely unknown (14–16).

Social learning theories

Many educational learning theories fall under the larger domain of Social learning theories in medical education. Lev Vygotsky (17) proposed that interacting and cooperating with other people leads to learning and that human development occurs by interaction with the more experienced. He also suggested that sharing of tasks leads to distribution of cognitive ability and thus individual performance can be enhanced by peers and experts. Another contribution by Vygotsky is the 'Zone of proximal development' which describes that the problem-solving capabilities of an individual are enhanced in collaboration with more capable peers and expert guidance (18).

Lave and Wenger (19) presented the theory of 'communities of practice' which relates to the a "set of relations among persons, activity and world, over time and in relation with other tangential and overlapping communities of practice" thus, learning is not merely acquisition of knowledge but a process of social interaction and active participation.

'Social interdependence theory' by Johnson et al. (20) suggests that achievement of goals can be impacted by the actions of others which can lead to a positive, negative or no interdependence. Positive interdependence describes the perception that individual goals can be achieved if the other person with whom they cooperatively work also reach their goals. Thus, this leads to efforts to promote each other's efforts to achieve goals and can lead to higher levels of learner achievement, positive relationships and enhance learner engagement and resilience.

Over the decades, medical educators have also increasingly discussed the positive impact of interprofessional education (IPE). Application of IPE in medical education has been shown to promote positive attitudes in students when different professional groups come in contact under predetermined conditions (21).

At St. Matthews University (SMU), we initiated a project primarily focused on the development of a CSL framework. The design served as a first step towards a better understanding of the benefits of CSL projects for community healthcare and provide insight to the community health challenges through this collaborative community-academic partnership. Additionally, we wanted to recognize competencies students achieve from this activity. Eventually, incorporating the experience to enhance the medical teaching curriculum at SMU.

Methodology

Study design - We employed a descriptive, interpretive qualitative study design involving thematic analysis of the students' perceptions towards CSL and, to discover prevalent health conditions in the community (22).

Ethical approval - The study was conducted after full ethical approval from the ethics committee and the institutional review board. Information related to the project and consent forms were sent to all students.

Participants - Voluntary students from basic science courses were enrolled for the project. After obtaining consent for the audio recording of interviews, students were grouped into two groups of six and seven students respectively. Both groups participated in a yearly health fair organized in collaboration between SMU and local health agencies on separate days.

Interview process - Interviews were conducted on a prearranged and mutually agreed day. Both focus groups were interviewed on different days using a set of open-ended questions.

Semi-structured statements were used to explore the topics of students' interest (see Table 1).

Table 1: Open ended questions asked in focus groups

| | |
|------------------|--|
| What? | Now that it's over, what are your first thoughts about this overall project (Reporting what happened, objectively)? What did you observe? What issue is being addressed or the population is being served? |
| So What? | What were some of your most challenging moments and what made them so? What were some of your most powerful learning moments and what made them so? What did you learn about the people/community that we served? What are some of the pressing needs/issues in the community? How does this project address those needs? How is your experience different from what you expected? In what ways did the group work well together? |
| Now What? | What learning occurred for you in this experience? How can you apply this learning? What information can you share with your peers or community volunteers? If you were in charge of the project, what would you do to improve it? If you could do the project again, what would you do differently? |

The interviews lasted for about 30 minutes for each group. The central question was "What impact has community service had on the learning of medical students?" Where appropriate, the interviewer faculty prompted participants to expand on relevant and interesting responses.

Data analyses - the process of data analysis is will be inductive in nature because it will determine the point of saturation when no new codes or concepts emerge (23). An audit trail was developed which included ongoing notes of all activities, discussions, and decisions made to enable others to judge the trustworthiness and dependability of the findings and interpretation (24). Firstly, interview was transcribed in the Nvivo software (25), and was read many times by two faculties (SN/AB) before coding also known as 'Familiarization'. Next the process of coding started with a detailed, "line-by-line" coding of

the focus group transcripts. As traditionally, line-by-line did involve, as the name suggests, coding each line of the transcript.

In the second stage of analysis, these codes were scrutinized and transcripts were reviewed and re-read several times (SN/ID/AB). It was ensured that the created codes accurately described the coded data and that there were no duplicates, or codes which cover the same content but are worded differently. At this stage, these descriptive codes were organized into a 'parent-child' relationship, which is a term used in Nvivo software to refer to the hierarchical organization of codes. Subsequently, each code was read and duplicates were eliminated by "merging" two or more codes. Next step is to generate themes, which includes combining several codes into a single theme. Too vague or irrelevant themes were discarded. To ensure the validity themes they were independently reviewed by one more (SN2) research expert (26).

Results

As a result of initial line-by-line analyses, there were 48 codes in the coding framework (see Table 2).

Table 2: Initial, line-by-line coding

| Code name | Files | References |
|---|-------|------------|
| Practice with patients | 2 | 9 |
| Being part of, and learning about the community | 2 | 8 |
| Dealing with the patients- comforting, making conversations, etc. | 2 | 8 |
| Empowering to see patients trust in your opinion | 2 | 7 |
| Teaches to make decisions | 2 | 6 |
| Reacting on the spot and decision making | 2 | 6 |
| Doing the test | 2 | 6 |
| Health issues- hypertension | 1 | 5 |
| Suggestions- Improve the organization | 2 | 5 |
| The event helps the community and educates them | 2 | 5 |
| Health issues- diabetes | 2 | 4 |
| Expectations vs. reality | 2 | 4 |
| The community members were educated about their health | 1 | 4 |
| Rotation was a good thing | 2 | 4 |
| Important to have real life practice | 2 | 4 |
| Good practice and review of your existing knowledge | 2 | 4 |
| The role of the student | 1 | 3 |
| What kind of population was there | 2 | 3 |
| Networking with older students | 1 | 3 |
| Being independent in your work | 2 | 3 |
| Overall good experience of real-life practice | 2 | 3 |
| Health issues- high cholesterol | 2 | 2 |
| Group work | 1 | 2 |
| Learning directly from healthcare providers | 1 | 2 |
| Not enough resources | 1 | 2 |
| What happened at the health fair | 1 | 1 |
| It was a community building event | 1 | 1 |
| Health issues- heart condition | 1 | 1 |

| | | |
|---|---|---|
| Learn to communicate with other healthcare professionals | 1 | 1 |
| Suggestions- more practical skills | 1 | 1 |
| Suggestions- have this experience more regularly | 1 | 1 |
| Suggestions- course about nutrition so that they can educate the patients | 1 | 1 |
| Suggestions- more guidance | 1 | 1 |
| A challenge of dealing with patients who did not want to take medicine | 1 | 1 |
| Would like more interaction with patients | 1 | 1 |

Organization of these 48 codes further into the descriptive 'parent-child' relationship codes are listed in Table 3.

Table 3: An example of organising the initial codes into a parent-child

| Parent category | Child codes | Files | References |
|--|---|-------|------------|
| The most challenging aspects | Dealing with the patients- comforting, making conversations, etc. | 2 | 8 |
| | Doing the test | 2 | 6 |
| | Reacting on the spot and decision making | 2 | 6 |
| | Not enough resources | 1 | 2 |
| | Taking blood | 1 | 1 |
| | Not discussing the results- because you were not qualified | 1 | 1 |
| | A challenge of dealing with patients who did not take medicine | 1 | 1 |
| What knowledge they were lacking from the university | Classes are theoretical and don't give real experience | 2 | 11 |
| | How to do the tests | 1 | 1 |
| | Would like more interactions with patients | 1 | 1 |
| The benefits of this event | Patient interaction | 2 | 15 |
| | Being part of, and learning about the community | 2 | 8 |
| | Empowering to see patients trust in your opinion | 2 | 7 |
| | Teaches to make decisions | 2 | 6 |
| | The event helps the community and educates them | 2 | 5 |
| | Important to have real life practice | 2 | 4 |
| | Good practice and review of your existing knowledge | 2 | 4 |
| | Networking with older students | 1 | 3 |
| | Being independent in your work | 2 | 3 |
| | Overall good experience of real-life practice | 2 | 3 |
| | Group work | 1 | 2 |
| Learning directly from healthcare providers | 1 | 2 | |

| | | | |
|-------------|---|---|---|
| | Learning to act professionally | 1 | 1 |
| | Empowerment as you are the real doctor | 1 | 1 |
| Suggestions | Suggestions- improve the organization | 2 | 5 |
| | Suggestions- less time pressure | 1 | 1 |
| | Suggestions- how to spread the information to peers | 1 | 1 |
| | Suggestions- to host a separate fair as a school | 1 | 1 |
| | Suggestions- to educate the community about health issues | 1 | 1 |

As the result of these processes, the number of codes was reduced to 26 in the final thematic framework. Table 4 outlines the thematic framework that emerged as a result of the analysis of two focus group transcripts.

Table 4: Focus group thematic framework

| | | |
|---|----------|------------|
| <u>Benefits of the event</u> | 2 | 104 |
| Bonding with, and learning about the local community | 2 | 33 |
| - <i>Learning about the characteristics and health needs of the community</i> | 2 | 18 |
| - <i>The event benefits the community in many ways</i> | 2 | 8 |
| - <i>Socializing and becoming a part of the community</i> | 2 | 7 |
| Opportunity to experience real-life practice and learn from the professionals | 2 | 18 |
| Opportunity to practice patient interaction | 2 | 17 |
| Empowering to see patients' trust and feel like a 'real' doctor | 2 | 8 |
| Improves decision-making skills | 2 | 8 |
| Opportunity to network with older students and healthcare professionals | 2 | 6 |
| Opportunity to experience various aspects of the profession through rotation | 2 | 5 |
| Practical review of the existing knowledge | 2 | 5 |
| Balance between group work and independent work | 2 | 4 |
| | | |
| <u>Challenges of the event</u> | 2 | 31 |
| Comforting patients and talking to them professionally | 2 | 8 |
| Doing a blood test | 2 | 7 |
| Making decisions on the spot | 2 | 7 |
| Organizational issues | 2 | 5 |
| Not being allowed to discuss the results with the patients | 1 | 1 |
| Not enough resources | 1 | 2 |
| Being expected to work independently | 1 | 1 |
| | | |
| <u>Suggestions for the curriculum</u> | 2 | 17 |
| Make university instruction more practical | 2 | 14 |
| Have this experience more regularly | 1 | 1 |
| Host a separate fair as a school | 1 | 1 |
| Introduce a course about nutrition | 1 | 1 |

The most discussed topic was '*benefits of the event*' (coded 104 times), followed by '*challenges of the event*' (coded 31 times) that the students faced and '*suggestions for the curriculum*' (coded 17 times).

Thus, the following three sections discuss the benefits and challenges that the students described, as well as their suggestions for the curriculum, respectively.

Benefits of the event

Among the most discussed benefits was *bonding with, and learning about the local community* (coded 33 times). This, in turn, involved *learning about the characteristics and health needs of the community* (coded 18 times), learning that *the event benefits the community in many ways* (coded 8 times) and *socializing and becoming a part of the community* (coded 7 times) (see Table 4).

Regarding the former, the participants not only commented on predominant health conditions, which included diabetes, high cholesterol and hypertension, but also shared their observations regarding the community's demographic characteristics.

Female student 1 group 1:

"I noticed a lot of Jamaicans and overall, they were healthier than you would see in like a hospital setting"

Male student 3 group 2:

"In general, they seemed pretty healthy"

Female student 1 group 1:

"Yeah, they were healthy from what I saw. Not terrible, but I think they actually went there for a part of the health fair, because it was offered to them for free"

Another comment by female student 6 group 1 linked to the second observation regarding the community and their health status and needs, namely that these events

"Make healthcare more accessible" and "Shine the light on how the available healthcare isn't enough"

The participants felt that for some members of the community these events were the only opportunity to have a screening done, due to both the availability and cost of healthcare.

Female student 3 group 1:

"For me, it became pretty clear that we've served an underserved community. Some of these patients don't go to see doctors. They wait for the health fairs because they know they can get free screening and see a physician afterwards"

Female student 2 group 1:

"I definitely agree. A lot of them mentioned that they go to these things many times a year, because it's the only time that they could actually get screening done." Some of them even have little cards, pretty much, the last time they got screened, just showing the progress of their cholesterol, their diabetes, and all their levels of everything. I think definitely it is an underserved community"

Female student 3 group 1:

"What they were able to do is get a full screening, a meeting with health staff, and the physician, and essentially, further planning for free"

According to another female student group 1, a reason why the members of this community may be willing to take advantage of these health fairs is that they

"Care more about their health" and "Are willing to know more about their health"

The comment was stated due to the religious affiliation of the student's church that follows an endorsed holistic focus within their belief system.

This, in turn, leads to the final observation that the participants made about the local community, namely that they seemed to be very aware of their health status and needs.

Male student 2 group 2:

"Whenever we would take their blood pressure, they had knowledge about what their normal pressures and normal blood glucose usually is. So, they were really good at that"

Female student 1 group 2:

"There were some persons who knew exactly that they were hypertensive or diabetic along with their family history"

Another aspect of 'bonding with', and 'learning about the local community' that the participants discussed was 'socializing' and 'becoming a part of the community' (coded 7 times, see Table 4).

Female student 1 group 2:

"Community bonding is a big thing and as the event involves a variety of community members and activities"

Female student 6 group 1:

"It was like a community building event, and we were also part of that"

“Since we’re here in the Cayman Islands, it’s nice to actually work with the people who live here and then also work with some of the professionals, the nurses, who work here”

Male student 4 group 1:

“People were there not necessarily for the test, they were there to take a look at the different companies, and it was a big networking thing for the nursing homes and health agencies”

This, in turn, directly leads to the third aspect of *‘bonding with’, and ‘learning about the local community’,* namely learning that *‘the event benefits the community in many ways’* (coded 8 times). In addition to the previously mentioned benefits in terms of opportunities to monitor health and network with other community members, the participants also noted that the events *‘educate the community on their health’.*

Another benefit of the health fair that the participants discussed was the *‘opportunity to experience real-life practice and learn from the professionals’* (coded 18 times).

Male student 2 group 2:

“In addition to continuous monitoring and support during the event, the fair started with an initial orientation during which the present health professionals gave us like from their experience and their tricks on how to do certain things”

Male student 2 group 2 who had “never really had the chance to volunteer to events like these”, felt that he “definitely learned a lot”, including “how to take blood pressure, BMI and especially the blood glucose”

Female student 6 group 1:

“We practiced on each other few minutes before we started and the nurses taught me little tricks”

“We had to learn how to use the equipment for the needle stick and where to put everything, and then how to interpret the results, as well as how to explain it to the patients”

Male student 4 group 1:

“Like nothing can really prepare you until you actually do it and it’s literally through mistakes that you learn the best ways”

Male student 1 group 1:

“You hear about all these tests, and I’ve never actually done it until now”

This leads to another discussed benefit of the event, namely that it was a *‘practical review of the existing knowledge’* (coded 5 times). Thus, in addition to learning new things from the present health professionals, the participants felt that this experience helped them translate their theoretical knowledge into practice.

Female student 1 group 1:

"Another interesting part is when you go in as a first semester, you're like, "What kind of cholesterol is it? HBA1C? What exactly does that mean? It all makes sense now"

Female student 4 group 2:

"We did a class last week taking patients' history. That was useful because that was the first station I was on. I know that in our lecture, they were talking about the importance of making the patient feel comfortable"

"I noticed the more I spoke to the person and like when I introduced myself to them, they talked to me more when I was taking their family history"

This comment linked to another widely discussed benefit of the event, namely that it provides 'opportunity to practice patient interaction' (coded 17 times). The participants felt that it was a "big learning point" to learn how to communicate with patients, to adapt to their age and needs, and to comfort them.

Female student 4 group 2:

"Because there were so many different ages, when I was talking to a child, I had to speak about different things and change my tone compared to when I was talking to a more mature individual"

Female student 2 group 2:

"It was really helpful to learn what's appropriate and what's not while interacting with patients"

The participants of group 1 shared these views and listed the patient interaction experience among the most valuable aspects of the event.

Male student 1 group 1:

"Loved the patient interaction, this was my favourite part. The patient interaction aspect of that was definitely something we could use more of"

Female student 3 group 1:

"I loved comforting the patients when they started getting nervous"

Male student 1 group 1:

"I think that the health fair surpassed my expectations, just because of the relationships that we made with the patients. I've had the ability to actually see two or three of the patients that I had again, later on the island"

Related to the benefit of practicing patient interaction is also that it is *'empowering to see patients' trust and feel like a "real" doctor* (coded 8 times). A student was impressed by "how the patients trusted our opinion so much, and they valued what we had to say about their results". In fact, she described this sense as being "the most memorable thing" and an experience that reminded her that "you're becoming physicians for a good reason". Another reflected on a similar experience, describing a shift in her self-positioning as compared to being a student in a classroom.

Male student 1 group 1:

"We were their doctor, doing their tests, trying to see what we can do for that patient, but when we're in class our teacher is like our doctor. We go to our professor, and we find out the physiological basis, and it's like that kind of interaction. And then the kind of interaction we got at the health fair, it's just interesting to see the dynamic like that"

Another benefit of the health fair was that it *'improves decision-making skills'* (coded 8 times). As generally "you get to see a better variety of patients" at such events, the participants were exposed to various uncommon situations. In some of these instances they observed other health professionals making the decisions, and in others they were the ones making them. A "challenging" patient who "was getting very apprehensive, but he really wanted his test to be done". The situation required the student to calm the patient down, and even though this experience was challenging, she seemed to appreciate it as a valuable one. Another student noted that "there were times where you had to turn on some critical thinking". This relates to both dealing with problematic and unexpected health issues and to simply being prepared to face different types of patients and react accordingly. When reflecting on differences between the 'Patient Doctor Relations' (PD) course and real-life practice a student described, "in PD it's my classmate, so she already knows what I'm going to say, versus when it's real live patient, you have no clue what they're going to say".

The participants also commented on the *'opportunity to network with older students and healthcare professionals'* (coded 6 times). As previously noted, they interacted with healthcare professionals, and not only did they learn a lot from them professionally, they appreciated the value of the interaction itself. In addition, they collaborated and interacted with older students, which not only contributed to their professional knowledge but also to potentially developing friendships.

Female student 6 group 1:

"I really enjoyed how, we were at the afternoon shift, but people from the morning shift took their time to stay back and teach us how to do everything. And interactions with fifth, fourth, third semesters really opened up new friendships here. It was really nice, because I actually met a good number of students, and I was a first semester"

Male student 1 group 1:

“There was a lot of nursing students there, that I was just like, wow. I wish I knew these people and I could see them more. So, it was really interesting”.

The teamwork aspect evident in the above extract also leads to another advantage of the event, namely that there seems to have been the right ‘*balance between group work and independent work*’ (coded 4 times). Whilst the participants did not always openly praise this *balance* itself, the theme was inferred from a combination of participants’ accounts that praised either effective group work or the opportunity to work independently. In some cases, however, the balance itself was mentioned.

Female student 2 group 1:

“If I can’t prick the finger, [another student] would come help squeeze the finger and then as they’re doing one thing, I’m going to draw up the test, write down their information. I think that group dynamic was really beneficial. If you needed someone else there, they were there”

Later other group members joined this conversation, and the following extract shows a discussion of how the participants felt about group work specifically.

Female student 2 group 1:

“When I had a problem, I told him that I need help, so he actually walked me through it, helped me, and confirmed that I can do it. So, it was very helpful. It made me feel better, made the patient feel better, it was calming in that stressful situation”.

Male student 1 group 1:

“Like, this is my colleague, you know? This is someone that I sit in class with every day, someone that we go through the same exams, the same struggles in the class together; we all feel the same stress. So, there’s no embarrassment when asking for help, or feeling like you can’t do something”.

“Because what I’m weaker at, she must be better in, so you don’t really see it as a weakness or feel embarrassed about asking for that help”

Another female student 3 group 1, on the other hand, focused on how independent work “was really fun” and contributed to her overall positive evaluation of the event that she “would love to be part of the curriculum”. She explained that she expected to be monitored more closely, but she “really enjoyed how independently we got to work”.

Similarly, male student 4 group 2 explained that “It was just kind of letting us do our own thing and we were teaching ourselves”. He also explained that although “it seemed at first kind of unprofessional”, “now that I think about it more, I think it’s really good because it gives you a chance to be independent”.

Regarding the organization of the event and the students’ work, the final discussed benefit was that the event provided ‘*opportunity to experience various aspects of professional practice through rotation*’

(coded 5 times). The students “rotated around” (Male student 1 group 1) various stations where they experienced various jobs and responsibilities, which gave them a feeling that “we had adequate training” and “we were all comfortable” (Female student 3 group 1).

Challenges of the event

Although, as previously noted, the participants generally praised the ‘*opportunity to practice patient interaction, comforting patients and talking to them professionally*’ (coded 8 times) was also mentioned as the most challenging aspect of the volunteering experience. One student (female; group 2) struggled with a patient who was afraid of needles and who had to have the blood taken several times as “his blood was clotted”. As a result, the patient was “getting very apprehensive” and “calming him down while actually trying to get enough blood from him was very difficult”.

Another student (male; group 2) commented on the challenge of convincing some patients who “were afraid of needles” to have their blood taken, although eventually, he noted, “they reacted in a good way”. A student (male; group 1) also mentioned the challenge of helping the patients “stay calm” if they needed their blood test re-done several times.

One student (female; group 2), in turn, reported challenging experiences with “self-conscious” patients who expected their blood glucose to be high and were reluctant to have the test taken. In these cases, she found it challenging to “encourage the patient even though it might be uncomfortable for them”. The same speaker also commented on female patients who wanted to take their belts and shoes off prior to having their weight recorded, as “they don’t want their weight to be higher and then when you calculate the BMI it to read overweight or obese”.

Yet another student (female; group 1), in turn, commented on the time when “the test takes a few minutes to run”, in which case “making conversation, finding that common ground, making [the patients] feel comfortable” was challenging.

The second most discussed challenge, and one that partially emerged in the above discussion, was the challenge of ‘*doing the blood test*’ (coded 7 times). In addition, some participants found “learning how to do [the test]” to be “definitely the most difficult part” as “we weren’t really trained” to do it. ‘*Making decisions on the spot*’ (coded 7 times) was also difficult, although, as previously noted, the participants also recognized the value of learning to make difficult decisions.

A group 2 male student reported that some patients who had a heart condition “admitted to not taking the medicine, because they didn’t want to”. As a result, he was confused and admitted to not knowing “what do you even do at that point”, which he found to be an “issue”.

The challenge of making decisions on the spot often referred, again, to the previously discussed challenges of talking to the patients and doing the blood test, as these were the main situations when the students had to make quick decisions for which they did not feel they had been prepared and trained.

Another challenge was certain '*organizational issues*' (coded 5 times), which also related in some cases to the '*lack of resources*' (coded twice). A student (female; group 2) felt that, at times, "it was just very disorganized and not put together". As she noted, "*one of the nurses had to go to the GP office and take their glucometer because we didn't have a working one*".

Other resources were also lacking occasionally, and "*we had to take everything back to the cancer centre, which was a walk across the street*". Regarding other organizational issues, another student (female; group 2) raised concerns that it was hot and there was no water for patients who were waiting in a line. Group 1, in turn, also felt that "just a little more organization" would help, and all discussed how "to handle all the people who want to get everything done" in a short amount of time was a problem.

'*Not being allowed to discuss the results with the patient*' (coded once) was believed to be a challenge by a student from group 1, who explained that "once I gave the patient the results", "it was hard to not then discuss the results with them". Finally, although, as previously noted, the participants generally praised the opportunity to work independently, while a student from group 2 felt that *being expected to work independently* was challenging at times.

"They were obviously instilling in confidence in us and it was kind of nice that they trusted us, it's a little nerve-wracking at first to be working on your own"

Suggestions for the curriculum

Although the main focus of the interview was on the participants' evaluation of the event, including its main benefits and challenges, several '*suggestions for the curriculum*' (coded 17 times) were openly made. The most common suggestion was to '*make university instruction more practical*' (coded 14 times). This also emerged from the above discussions of the main benefits of the event, where several of these benefits related specifically to the opportunities to practice skills needed in the profession and implement the previously gained theoretical knowledge into practice.

As previously noted, the participants made several comments in which they explained how important practical skills are. These views were evident throughout the interview and were stressed again when the participants suggested that "in class we do a lot of theory, and even PD really doesn't give you that real interaction with a real patient. Everything is scripted, and everything is acted out". In general, a student felt that "one of the biggest problems that we have as students going through PD is that we end up sounding very mechanical" and "you sound almost like a robot reading and getting through the bullet points on the paper". Additionally, "when you're actually out in the field, running these tests was an excellent opportunity to actually interact with another human being".

Other group members shared these beliefs.

Female student 3 group 1:

“What you learn in the classroom, you’re gonna learn facts, and sometimes putting it into practice is not as easy as it seems”

Male student 4 group 1:

“The second you get on the field and it’s actually put into practice; you realize that you really haven’t learned anything”

When discussing the importance of making the university instruction more practical, several participants also discussed the previously mentioned skill of taking the blood test, as they did not feel they had been sufficiently prepared for this. Further to the above reflections on the value of the opportunity to implement theory into practice, group 2 felt that they would like to *‘have this experience more regularly’* (coded once), and group 1 discussed the possibility *to host a ‘separate event as a school’* (coded once). They felt that *“we, as a school, should hold our own fair out there”*. The final suggestion, made by group 2 participants, was to introduce a course about nutrition.

Female student 2:

“Most prevalent here is diabetes and hypertension, for sure”

“It’s harder to eat healthy here because it’s more expensive and lack of healthcare insurance can worsen hypertension and diabetes, which are really prevalent here”

Male student 1:

“A nutrition course could be added somewhere. Biochemistry has a lot to do with nutrition. So, maybe we can just have nutrition portion of how we should tell patients what certain diseases to adapt do”

Male student 2:

“I feel like if we did have a nutrition course as an elective, I specifically would be interested in that. I love nutrition. I feel like more students would definitely benefit from that”

Table 5 lists the attainment of competencies and learning objectives from their reflection of this activity.

Table 5: Student’s attainment of the learning objectives- quote from their reflection

| Learning objectives | Competency |
|----------------------|--|
| Communication | <p><i>"...how to explain it to the patients, and then we saw the patients run through. And basically, interacted with them. That was a good part of it".</i></p> <p><i>"So, we did some patient teaching and I guess, tried to convince her to take her meds, but that was issue".</i></p> <p><i>"For me, it was patient interaction. Hands down. It was my favorite part of it".</i></p> |
| Team work | <p><i>"I was working with a nurse, I think her name was Nancy, and we came across a couple patients who actually did have a heart condition, they did have their problems".</i></p> <p><i>"Say if like, she is sitting next to me and I can't prick the finger, she would come help squeeze the finger"</i></p> <p><i>"I think the group work came in when we trained each other. Being trained and then training the next shift".</i></p> |
| Civic responsibility | <p><i>"I think seeing that and being able to identify what the patient is going through, and addressing it with them, and trying to help them through that is something that is important".</i></p> <p><i>"For me, it became pretty clear that we've served, and underserved community. From what I understood talking to the patients. Some of these patients don't go to see doctors. They wait for the health fairs because they know they can get free screening and see a physician afterwards".</i></p> <p><i>"To educate the community on their health. So, without them, in a community that may seem underserved, this is the only way that they will get the help that they need, and the education that they need".</i></p> |
| Academic development | <p><i>"We had to learn how to use the equipment for the needle stick, and where to put everything, and then how to interpret the results, like the triglycerides, the glucose levels, everything that was involved in that".</i></p> <p><i>"Learning how to do the test".</i></p> <p><i>"Another interesting part, I think, is when you go in as a first semester, you're like, "What kind of cholesterol is it? HBA1C? What exactly does that mean?" But then,</i></p> |

actually when you come to second semester and you look back, it's like, "It all makes sense now".

Discussion

This study explored medical students' perceptions and expectations of a community-based healthcare service program and how local health agencies and their medical school can prepare them best for community service. Overall, students reported positive perceptions of community service, including reports on characteristics and health needs of the society, enhancement relationship with senior and fellow colleagues, and having higher levels of responsibility due to direct clinical 'hands-on' experience as compared to learning at medical school.

Communication, team work, civic responsibility and academic development were the top competencies discussed by the students after the event. These competencies help a medical student to understand the functioning of a physician in the society and aim for the true goal of medical education which is to work in collaboration with the society and strive to improve health systems and patient care (27).

The current CSL project also underpins the application of social learning theories with the key attributes of focus on learning as a social activity, interaction with other medical professionals in context, cooperative learning and the ability of such social interactive learning to stretch the learning ability of a student beyond one's individual ability to perform tasks. This is achieved by observation, modelling, performing tasks and peer learning.

Overall benefits

Current study and various CSL models that have been proposed by researchers are targeted towards creating community-oriented healthcare professionals aligned with identification and addressing the health care needs of the society. Of these, some have even shown to enhance students' awareness and perspectives of humanism in medicine (9, 28). While studies have shown that professional-role exchange can better initiate students to the practice of interprofessional collaboration and enhance the awareness of medical students' role (29, 30). In accordance with our findings, research on IPE shows a positive impact on the cooperation between the medical and nursing professionals (30).

Similar to ours, another CSL model describes the effectiveness of such programs in developing the participants self-reported empathy, cultural competence, communication skills and openness towards peer teaching (3, 31). Peer learning and support, which is another important finding of our study, has also been described by researchers as enhancing medical knowledge, procedural skills (32) along with the professional development of all students involved in such interactions (5, 33, 34). While developing a culture of community outreach, CSL programs similar to ours, have also shown improvement in student attitudes towards patients (35) and development of social accountability (36-39).

Challenges of the event

Common challenges faced by our students include comforting and communicating professionally, working independently, organizational issues, lack of resources and ethical issues. Similar to our findings, studies have listed CSL challenges including language and cultural barriers or potential to harm the patient (34, 40). A similar potential negative effect from the same study included creation of dependencies of local communities on the local clinic or at the level of government policies and health insurance (40). Funding has also been a crucial factor for sustainability of such projects (34). The CSL project at SMU was fully funded by SMU and supported by local organization (Cayman Heart Fund).

Improving the curriculum

Various US national accreditation boards including the LCME and the NBME have suggested inclusion of active learning strategies in the teaching curriculum (41). Based on these recommendations, modern day educational models now focus more than before and have increased teaching time for nutrition courses in the medical school (42, 43). Our study found prevalence of adult-onset diabetes, hypertension, and nutritional imbalance in the local community. Suggestion was made to increase teaching time for these topics in various basic science courses.

Strengths and limitations of this study

Strength of the present study is that the results benefitted from the focus groups since it provides insight into social relations. The information obtained reflects the social and overlapping nature of knowledge better than through interviews and surveys.

The limitation of the present study includes the limitation of coding process and themes due to the exact wording and focus of the questions and by those not included. Another limitation was the small number of participants in this study; thus, the results cannot be generalized to the population. Also, the results are not transferable universally, as all students were from North America and the study was conducted in Cayman Islands. Another limitation includes the influences by others' comments and sentiments in focus groups vs. private interviews and opinions.

Implications and recommendations

Modern day healthcare education focus is constantly shifting towards 'community oriented' and 'prevention' rather than just diagnosis and treatment of diseases (44). Exploring the benefits of CSL, challenges faced and recommendations by students is essential to create a framework that would provide medical students with relevant and valuable professional experiences, as well as opportunities to learn about priority health conditions and needs in the community. This has further enabled recognition of competencies achieved by the students and guided inclusion of prevalent health conditions into the curriculum at SMU. As a result, nutritional imbalance, diabetes and hypertension are allocated additional teaching time.

Future research could focus on investigating the impact of CSL on public health systems, inclusion of CSL as a credit-based course in the medical curriculum and understanding perceptions of key

stakeholders.

Conclusion

CSL exposes students to a range of people in their workplace. Thus, medical educators should focus on creation of such community programs that align education with the medical knowledge, skills and experience of practicing health professionals, leading to an overall enhancement of medical education and public healthcare.

Abbreviations

CSL- Community Service Learning

IPE- Interprofessional Education

SMU- St. Matthews University

NBME- National Board of Medical Examiners

LCME- Liaison Committee on Medical Education

Declarations

Ethics approval and consent to participate

The current research was conducted in accordance with the Declaration of Helsinki guidelines and the study was reviewed and obtained ethical approval from the St. Matthews University (SMU) School of Medicine Institutional Review Board.

Consent for publication

Informed consent was obtained from the participating students

Availability of data and materials

All data generated or analyzed during this study are included in this published article [and its supplementary information files]

Competing interests

The authors declare that they have no competing interests

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Authors' contributions

(Samal Nauhria SN, Irene Derksen ID, Shreya Nauhria SN2, Amitabha Basu AB)

All authors (SN, ID, SN2 and AB) were involved with the design of the study, SN, ID and AB collected and organized the data, SN2 analyzed and interpreted the data and was a major contributor in writing the results, SN prepared the initial draft of the manuscript, ID and AB revised the manuscript. All authors (SN, ID, SN2 and AB) read and approved the final manuscript and the submitted version and have agreed both to be personally accountable for the author's own contributions and ensured that questions related to the accuracy or integrity of any part of the work, even ones in which the author was not personally involved, are appropriately investigated, resolved, and the resolution documented in the literature.

Corresponding author- SN

Prior Poster Presentation- An abstract poster has been presented at the International Association of Medical Science Educators (IAMSE) Annual meeting 2020. Link- <https://julnet.swoogo.com/iamse2020/Posters> (poster 227)

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