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Medical students' perceptions of small group teaching effectiveness in hybrid curriculum

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Abstract:

OBJECTIVES: The objective of this study was designed to investigate medical students' perceptions of small group teaching effectiveness in a hybrid curriculum.

MATERIALS AND METHODS: A cross-sectional, descriptive survey was conducted at the School of Medicine, The University of the West Indies, St. Augustine where we collected the data from 195 undergraduate students. A self-administered questionnaire consisting of 25 items was used to measure students' perception on the effectiveness of problem-based learning (PBL) with regard to learning experience, teamwork, confidence, communication skills, and role of the tutor. Statistical analyses included mean and standard deviation for the description of each item; *t*-test to compare the mean scores for gender and class year, and one-way analysis of variance between groups for age group comparisons.

RESULTS: The students overall perceptions of small group teaching effectiveness showed that the PBL sessions were beneficial to their learning process (mean: 3.63 ± 0.46). Students have positive perceptions toward small group effectiveness, particularly in learning experience (mean: 3.98 ± 0.63) and teamwork (mean: 3.67 ± 0.58). The mean scores, measuring teamwork, for 2nd year students was significantly higher than that for 1st year students (3.76 ± 0.55 and 3.55 ± 0.60 respectively, $P = 0.13$). A similar significant trend was observed between 2nd year and 1st year students on communication skills (3.48 ± 0.67 and 3.29 ± 0.55 , respectively, $P = 0.046$).

CONCLUSIONS: PBL is an effective small group teaching method for medical students. Faculty development and students' training programs are required before implementing PBL.

Keywords:

Faculty, perception, problem-based learning, small group teaching, students

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Introduction

Medical curriculum, at present, is inclined toward competency-based education that promotes active and lifelong learning. Each medical graduate is expected to have adequate knowledge, skills, and attitude in the field of medicine. Students need to get actively involved in the learning process, and small group teaching is optimal for this. Small group teaching plays a pivotal role in the all-round education of students, whether it is a tutorial, a seminar, simulated learning, or the problem-based

learning (PBL).^[1] PBL is a widely popular, innovative and effective learning approach conceived and implemented in education to enhance students' application of knowledge, higher-order thinking, and self-directed learning skills.^[2] In PBL, students get the opportunity to discuss the issues, ask questions, and reflect critically while interacting with one another.

One of the significant characteristics of PBL approach is the small learning group. Working in small groups make the students active, confident, and independent in their learning. The small group makes it possible for students to support each other in the problem-solving

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process and provides a means to “scaffold” the learning process of the student.^[3] Students feel comfortable to express their thoughts and ideas clearly. They can reflect on their experiences while learning from their peers.^[4] Small group teaching increases students' interest in learning; provides the opportunity to clarify points of confusion; promotes student-faculty and peer-peer interaction; enhances teamwork ability and fosters communication skills.^[5,6] In addition, small group teaching is useful in promoting higher-level intellectual skills such as reasoning, problem-solving, and critical thinking. These skills are also important for medical students who will eventually become involved professionally with patients and other health-care professionals.^[7] However, a few studies reported that PBL as a small group teaching method is time-consuming; tutor intervenes frequently and does not impact on knowledge acquisition.^[8,9] In addition, lack of proper seating arrangements; improper classroom environment, and unequal participation among group members influence negatively toward the effectiveness of small group teaching.^[1,10-12]

The medical school at the University of the West Indies, St. Augustine, uses a hybrid system of the curriculum where students get the opportunity to learn in two different and distinct teaching methods.^[13,14] One method is the PBL in small group settings whereas the other method comprises the didactic lectures and laboratory practical. Students utilize their previous knowledge and take part actively in the PBL process because the topics covered during the PBL session have already been taught during the didactic lectures. Each PBL group, which comprises of 11–13 student and a tutor, meets once a week approximately for three hours.^[14] This is a student-centered approach where a great responsibility is placed on the students. Students volunteer to lead the group, act as scribe to document the contributions made by the group and take part actively in both brain storming and discussion sessions. During PBL, the students discuss the learning objectives/questions from the previous problem and then start brainstorming a new problem for which they generate learning objectives/questions for a week of private study.

A number of publications have reported students' perceptions of effective tutors in PBL curricula.^[15,16] However, relatively little is known about perceptions of students on the effectiveness of PBL as a small group teaching.^[17] The purpose of the study was to measure the perceptions of medical students on the effectiveness of PBL in hybrid curriculum.

Materials and Methods

A cross-sectional, descriptive survey was conducted at the School of Medicine, The University of the West Indies,

St. Augustine where we collected the data from year 1 and year 2 medical undergraduate students. Demographics of the students can be found in Table 1. A total of 85 1st year students and 110 2nd year students completed the questionnaire. Of these respondents 65 (33.33%) were male, and 130 (66.67%) were female. The mean age of respondents was 21 years, with a range of 19–32 years. The largest percentage of respondents were at the age of 20 or younger (45.64%) and 21 years (35.90%).

The questionnaire was developed by the authors, who have experience in medical education and educational research. A pilot test of the questionnaire was administered to 20 preclinical students. Their responses and feedback were used to assess the format, language, and clarity of stated items. Based on the feedback given by the students and after consultation with 4 faculty members, necessary modifications of the questionnaire were made. The 25 items questionnaire used on a 5-point Likert scale as “strongly agree,” “agree,” “neutral,” “disagree,” or “strongly disagree” to measure students' perception of small group effectiveness. The questionnaire consisted of items in 5 parts assessing the students' perception on learning experience, team work, confidence, communication skills, and role of the tutor in small group teaching. The internal consistency of all 25 items measured by Cronbach's alpha reliability test was 0.85. The questionnaire also included the open-ended questions to get comments from the students on the challenges and benefits of small group teaching.

The students filled the questionnaires at the end of the 2016–2017 academic year. The participants were informed about the objectives and importance of the survey. Participation was voluntary, and all participants remained anonymous. Ethical approval for the study was obtained from the Campus Ethics Committee, the University of the West Indies, St. Augustine. Data analysis was performed using SPSS version 21 software (IBM Corporation, New York, USA). The continuous variables were summarized as mean and standard deviation for each item of the questionnaire. Student's *t*-tests were used to analyze differences between the perception of students on small group teaching effectiveness with respect to their gender and year of

Table 1: Demographic information of participants

Participants	Characteristics	Frequency (%)
Gender	Male	65 (33.33)
	Female	130 (66.67)
Current class	Year 1	85 (43.59)
	Year 2	110 (56.41)
Age	20 or younger	89 (45.64)
	21	70 (35.39)
	22	12 (6.15)
	23 or older	24 (12.30)

study (year 1 and 2). To compare the impact of age on small group teaching effectiveness, a one-way analysis of variance (ANOVA) was used. $P < 0.05$ was considered statistically significant for both t -tests and ANOVA. Finally, the qualitative answers on the open questions by the students were categorized after carefully reading all the answers in relation to the research questions.

Results

The students overall response showed that the PBL sessions were beneficial to their learning in a hybrid curriculum (mean: 3.63 ± 0.46). Table 2 shows that out of the 5 components of the small group teaching, students scored highest (3.98 ± 0.63) on "learning experiences" and lowest (3.40 ± 0.63) on "communication skills." The mean score for the 25 items varied between 2.14 and 4.24. The highest scoring items were for "discussions held in small group helped in understanding the subject better" (4.24 ± 0.75); "the knowledge and skills acquired in the group will help me in clinical practice" (4.07 ± 0.94) and "learning in small group helped me improving my ability to think and solve problems rather than just memorizing information" (4.06 ± 0.87). Items with lowest mean scores were "few members in the group talk too much and some don't talk enough" (2.14 ± 1.06) and "I felt nervous when I was asked to express my thoughts in a group" (2.85 ± 1.34).

A two tailed t -test (independent sample) showed that there was no significant difference between the mean scores of male and female students on the learning experience, team work, confidence, communication skills, role of the tutor, and overall students' perceptions. However, the mean scores of female students in each of the components are higher than their male counterparts [Table 3].

We did not find significant difference when years of the students were taken into account for learning experiences, confidence, role of the tutor, and overall effectiveness [Table 4]. However, the mean scores, measuring teamwork, for 2nd year students was significantly higher than that for 1st year students (3.76 ± 0.55 and 3.55 ± 0.60 respectively, $P = 0.13$). A similar significant trend was observed between 2nd year and 1st year students on the component of communication skills (3.48 ± 0.67 and 3.29 ± 0.55 , respectively, $P = 0.046$).

The F -test for the one-way ANOVA between groups was conducted to compare the differences in each of the five components concerning to students' perceptions of small group teaching effectiveness and the age of the students [Table 5]. The association between students' perception on each factor of small group teaching effectiveness and age were not significant. In addition, $P = 0.470$ displayed on the table indicates that there

Table 2: Item-wise average scores for students' perception of small group teaching effectiveness

Small group effectiveness factors	Mean±SD
LE	3.98±0.63
Discussions held in small group helped in understanding the subject better	4.24±0.75
Learning in small group helped me improving my ability to think and solve problems rather than just memorizing information	4.06±0.87
The activities taught me life-long learning	3.62±1.01
Small group sessions led me to deep and active learning	3.89±0.87
The knowledge and skills acquired in the group will help me in clinical practice	4.07±0.94
TW	3.67±0.58
The activities in problem-based learning helped me to develop skills on working as a member of a team	3.93±0.73
I feel working in groups is a waste of time	3.73±1.06
My group members made me feel as though, I am not as smart as they are	3.25±1.16
Group members were respectful to all the members	3.44±1.01
It becomes easier to learn when members of the group share their thoughts, ideas and information	3.97±0.89
Co	3.57±0.69
Small group made the learning more challenging, interesting, motivating, engaging, and fun	3.81±1.58
The activities in small group helped me improving my leadership skills	3.93±0.82
My interest in learning the subject increased while working in groups	3.54±1.03
I felt nervous when I was asked to express my thoughts in a group	2.85±1.34
Learning in small group motivated me to work hard and participate actively in the group activities	3.70±1.01
CS	3.40±0.63
Small group activities improved my ability to communicate effectively	3.91±1.38
I listen more attentively to what other members talk in the group	3.86±0.85
I feel easier to express doubts and feelings in a small group	3.50±1.08
Few members in the group talk too much, and some don't talk enough	2.14±1.06
I developed the ability to summarize the views of others	3.58±0.92
RT	3.55±0.74
Tutor in the group provided proper guidance for self-learning	3.76±1.37
Tutor paid sufficient personal attention to the students during the PBL process	3.64±1.05
Tutor was talking a lot in some of the sessions	3.09±1.18
Tutor encouraged all students including less involved students to take part in the discussion	3.85±1.09
Tutor provided useful feedback on my progress	3.44±1.22
Overall	3.63±0.46

PBL=Problem-based learning, SD=Standard deviation, LE=Learning experiences, TW=Team work, Co=Confidence CS=Communication skills, RT=Role of the tutor

existed no significant differences ($F = 0.85$) in the overall teaching effectiveness score with regard to the age of the students.

Table 3: Comparative scores for students' perceptions of small group teaching effectiveness according to gender

Variables	Male	Female	t	P (two tailed)
Learning				
Experiences	3.86±0.66	4.03±0.61	1.85	0.066
TW	3.56±0.64	3.72±0.55	1.78	0.078
Co	3.55±0.68	3.58±0.70	0.11	0.909
Communication				
Skills	3.38±0.63	3.41±0.63	0.02	0.983
RT	3.50±0.87	3.57±0.67	0.64	0.522
Overall	3.46±0.59	3.51±0.53	1.17	0.244

TW=Team work. Co=Confidence, RT=Role of the tutor

Table 4: Comparative scores for students' perceptions of small group teaching effectiveness according to year of study

Variables	Year 1	Year 2	t	P (two tailed)
Learning				
Experiences	3.97±0.60	3.98±0.66	0.12	0.908
TW	3.55±0.60	3.76±0.55	2.50	0.013
Co	3.47±0.63	3.64±0.73	1.45	0.148
Communication				
Skills	3.29±0.55	3.48±0.67	2.01	0.046
RT	3.61±0.67	3.49±0.79	1.14	0.258
Overall	3.58±0.43	3.66±0.48	1.26	0.211

TW=Team work. Co=Confidence, RT=Role of the tutor

Table 5: The one-way analysis of variance between groups to according to age (n=195)

Factors	Sources of variation	Sum of squares	Mean square	F	P
LE	Between	2.05	0.68	1.72	0.165
	Within	75.92	0.40		
TW	Between	0.91	0.31	0.90	0.443
	Within	64.75	0.34		
Co	Between	3.05	1.02	2.15	0.095
	Within	90.29	0.47		
CS	Between	1.38	0.46	1.18	0.320
	Within	74.82	0.39		
RT	Between	0.53	0.18	0.32	0.812
	Within	105.97	0.56		
Overall	Between	0.54	0.18	0.85	0.470
	Within	40.62	0.23		

LE=Learning experiences, TW=Team work. Co=Confidence CS=Communication skills, RT=Role of the tutor

Students' comments

The responses of the students to open-ended questions on small group teaching effectiveness were used for the quantitative analysis.

Benefits of PBL

On learning experience, the students highly appreciated the PBL as it helped them in developing problem-solving and critical thinking skills. They believed that it would be helpful for them to think in clinical perspective. One of the participants has expressed the benefits of PBL"

"Small group PBL sessions are definitely beneficial. It helped with the clarification on certain topics that I was unsure of. It is a best example of self-directed learning which will be useful in my future studies and profession."

Many students believed that learning in PBL helped them to understand the significance of team work for effective learning. One student commented:

"PBL taught me to work as a team. I understood how leader, scribe, and each member of the group have to work together as a team to create a vibrant and effective learning environment."

Learning in small group also allowed students to augment their level of confidence. Many quieter and less participatory students felt comfortable to speak in a small group. As one student stated:

"It allowed me to overcome nervousness while speaking in front of class. The group members were friendly and cooperative which assisted me; it helped me to boost my confidence and my ability to express my thoughts and researched information."

The enhancement of communication skills by PBL was mentioned by some of the students. It brought students more satisfaction in their learning because they got opportunity to express their thoughts; listened attentively; asked questions; and interacted with one another. One students stated:

"I'm able to communicate better. It improved my interpersonal skills and motivated me to work hard."

Many students highlighted the importance of tutors in facilitating the PBL process. Some of the students expressed their satisfaction with the support, guidance, and feedback given by the tutors. One of the students reflected:

"Tutor encouraged quieter students, like me, to take part in the discussion and also gave feedback at the end of the session."

Challenges

Although students found a lot of good reasons to admire learning through PBL, many of them also expressed views on its potential drawbacks and challenges. Despite the fact that students generally enjoyed the learning experiences, some students voiced their concerns about the workload and improper time management in PBL.

It was believed by some students that few of their peers were unenthusiastic about PBL process. Their contribution was minimal in formulating hypotheses

and objectives. In addition, they did not show interest participating in the discussion.

Some students considered themselves disadvantaged by PBL because they did not get enough confidence to express their thoughts in front of the brighter students. Although some students stated that the PBL process helped them in better communications, few other students remained quiet throughout the sessions and did not contribute in the learning process. Some students were very much worried about their peers who were dominating the sessions with their smart communication skills.

Many of the tutor-related issues reported by the students were tutors' excessive interference in the PBL process; giving lecture in the group; lack of proper guidance and motivation to the group, and not giving feedback to the students. One student has reflected:

"I would like more guidance from tutors. I feel like they should be more encouraging and less dominating. They should understand that every student learns differently. Some students feel pressured when tutors ask a lot of questions during discussion/presentation."

Discussion

This study investigated the perspectives of medical students about the small group teaching experience, specifically PBL, in five major areas; learning experiences, teamwork, confidence, communication skills, and role of the tutor. At the Faculty of Medical Sciences, St. Augustine campus, we have been using a hybrid curriculum including lectures and PBL since 1989.^[13] To improve the effectiveness of PBL as a learning tool, it is necessary to assess the pros and cons of PBL on students' perspective.

The mean scores of most of the statements are close to or higher than four (on a 5-point scale), which is in consistent with the study conducted by Dochy *et al.*^[3] This indicates that that PBL has a significant and positive influence on students' educational practice. Several studies reported that small group teaching sessions have positive effects on students learning.^[5,8,11,18] In our further investigation, we did not find any significant difference in students' perception on the effectiveness PBL in terms of gender, academic year, and age of the students. It reveals that students, irrespective of their gender, year of study, and age have similar perception on PBL.

A number of studies have demonstrated that small group teaching helps in enhancing problem-solving skills; improving self-directing skills; providing the

opportunity to clarify the point of confusion, increasing understanding of the subject; and developing critical thinking and fostering active learning.^[3,5,7,18] In the current study, we noted the similar findings where students showed a positive learning experience from the PBL. Students reported the benefits of PBL in promoting their problem-solving and critical thinking skills. Further students commented that PBL helped them in-depth understanding of the subject matter which could be helpful for them in their clinical practice.

One of the "powerful" characteristics of PBL is that it gives opportunity to the students to work as a team. Truly speaking, a collection of individuals is not a team until they work collectively; interact and listen attentively to one another, and respect the views of others. A PBL group motivates its members to exert maximum effort and help each other to create an effective learning environment.^[19] In the present study, we found that PBL-provided students the avenue for teamwork and collaborative learning. Further, the comments given by students reflect that they learned to respect one another's point of view and work together for constructive learning.

It is important to recognize if PBL has any effect of students' perception on fostering confidence. In our study, gender, year of study, and age were not significantly associated with students' perception on increasing their level of confidence due to small group teaching. However, the mean score of year 2 students (3.64) on students' perception on confidence is slightly higher than the mean score of year 1 students (3.47). At the beginning of year 1, the students were apprehensive and distant, but gradually they got more confidence and moved closer to take part in the brain storming and discussion process. This suggests that a period of getting used to the way of working in a PBL environment was necessary for students to be able to cope with it.^[3]

A number of studies have reported advantages for small group teaching method which include increasing opportunities to ask questions; increasing student-faculty and peer-peer interaction; improving communication skills, and improving presentation skills of the students.^[5,7] In our study, students indicated that learning in small group settings have helped them communicating effectively. However, many students have reported that they felt nervous when they were asked to express their ideas and thoughts. It may be because few students were overtalkative, and they were trying to dominate the group. As a result, the quieter students did less or no efforts to interact. In a study carried out by Rahman *et al.*, the authors have found in many cases that the students were not satisfied in

working within a group and all members within a group did not participate equally in the discussions.^[20]

Tutor plays a nondirective but, a significant role in facilitating the small group sessions.^[8,21] In the present study, the mean scores for students' perception about the role of the tutor ranges from 3.09 to 3.85 as compared to Chung *et al.*, who found the mean score varied between 4.03 and 4.17.^[21] The lowest scoring item as we found is "Tutor was talking a lot in some of the sessions." Further, the answer to the open-ended questions confirms that students have expressed their dissatisfaction with the dominating role played by some of the tutors. An important implication of this finding is that faculty development should take place highlighting on how to and not to intervene the PBL session.^[21,22] Instead of playing the dominating role, tutor should motivate leader to lead the group and encourage other members, including the quieter students, to take part actively in the learning process. Besides, tutor should provide constructive feedback to the students at the end of each problem because it contributes to their progress in learning throughout the medical program.^[8,23]

Limitations of the study

Since this study has conducted at one institution, its findings might not be generalizable to other institutions because we cannot assume that students' perception in one institution applies to other contexts and other groups of students. Another limitation of the study is that the questionnaire developed by the authors is not free from subjectivity, therefore, result should be interpreted with caution. Further, teacher plays a vital role in small group teaching and thus, we suggest future studies to assess tutors' perception of small group teaching effectiveness. It is also suggested that future studies assess the link between students' perceptions of small group PBL work and their academic achievement.

Conclusion

The results indicate that students' perception of small group teaching is positive. This includes enhancing basic communication skills; building confidence, and the augmenting of both problem-solving and critical thinking skills. There are more benefits of small group PBL sessions than the challenges. The main challenges would be unequal participation among the members of the group; talkative students who try to dominate the group; quieter students who do not participate in the group discussion, and tutor's excessive interference in the PBL process. Faculty development program would be useful for the tutors to address these issues. Concurrently, proper orientation should be given to the students at the beginning of each semester to make the PBL more vibrant and effective.

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Conflicts of interest

There are no conflicts of interest.

References

1. Jaques D. Teaching small groups. *BMJ*, 2003. 326 (7387): p. 492-4.
2. Hung W. The 9-step problem design process for problem-based learning: Application of the 3C3R model. *Educational Research Review*, 2009. 4 (2): p. 118-41.
3. Dochy F, Segers M, Bossche PVD, Struyven K. Students' Perceptions of a Problem-Based Learning Environment. *Learning Environments Research*, 2005. 8 (1): p. 41-66.
4. Robillard DT, Spring LM, Pasquale J, Savageau JA. Identifying characteristics of effective small group learning valued by medical students and facilitators. 2011; Paper 120:[Senior Scholars Program]. Available from: <http://escholarship.umassmed.edu/ssp/120>.
5. Euliano TY. Small group teaching: clinical correlation with a human patient simulator. *Adv Physiol Educ*, 2001. 25 (1-4): p. 36-43.
6. Guraya SY, Almaramhy HH. Small group teaching improves students' acquisition of knowledge and skills. *Saudi Med J*, 2012. 33 (12): p. 1304-9.
7. Saleh AM, Shabila NP, Dabbagh AA, Al-Tawil NG, Al-Hadithi TS. A qualitative assessment of faculty perspectives of small group teaching experience in Iraq. *BMC Med Educ*, 2015. 15: p. 19.
8. Al-Drees AA, Khalil MS, Irshad M, Abdulghani HM. Students' perception towards the problem based learning tutorial session in a system-based hybrid curriculum. *Saudi Med J*, 2015. 36 (3): p. 341-8.
9. Hartling L, Spooner C, Tjosvold L, Oswald A. Problem-based learning in pre-clinical medical education: 22 years of outcome research. *Med Teach*, 2010;32:28-35.
10. Steinert Y. Twelve tips for effective small-group teaching in the health professions. *Medical Teacher*, 1996;18:203-7.
11. Edmunds S, Brown G. Effective small group learning: AMEE Guide No. 48. *Med Teach*, 2010;32:715-26.
12. Singaram VS, Dolmans DH, Lachman N, van der Vleuten CP. Perceptions of problem-based learning (PBL) group effectiveness in a socially-culturally diverse medical student population. *Educ Health (Abingdon)*, 2008. 21 (2): p. 116.
13. Addae JI, Wilson JI, Carrington C. Carrington, Students' perception of a modified form of PBL using concept mapping. *Med Teach*, 2012. 34 (11): p. e756-62.
14. Addae JI, Sahu P, Sa B. The relationship between the monitored performance of tutors and students at PBL tutorials and the marked hypotheses generated by students in a hybrid curriculum. *Med Educ Online*, 2017. 22 (1): p. 1270626.
15. De Grave WS, Dolmans DH, Van Der Vleuten CP. Student Perspectives on Critical Incidents in the Tutorial Group. *Advances in Health Sciences Education*, 2002;7:201-9.
16. Das M, Mpofu DJ, Hasan MY, Stewart TS. Student perceptions of tutor skills in problem-based learning tutorials. *Med Educ*, 2002. 36 (3): p. 272-8.
17. Steinert Y. Student perceptions of effective small group teaching. *Med Educ*, 2004. 38 (3): p. 286-93.
18. Walton H. Small group methods in medical teaching. *Med Educ*, 1997. 31 (6): p. 459-64.
19. Dolmans DH, De Grave W, Wolfhagen IH, van der Vleuten CP. Problem-based learning: future challenges for educational practice and research. *Med Educ*, 2005. 39 (7): p. 732-41.

20. Rahman SM, Sarkar MA, Gomes JJ, Mojumder FA. Student perceptions of learning science in small groups: A case study in higher education. *Brunei Int J Sci Math Educ*, 2010. 2 (1): p. 32-47.
21. Chung E, Hitchcock MA, Oh S, Han E, Woo Y. The relationship between student perceptions of tutor performance and tutors' background in problem-based learning in South Korea. *Int J Med Educ*, 2011. 2: p. 7-11.
22. Azer SA. Challenges facing PBL tutors: 12 tips for successful group facilitation. *Med Teach*, 2005. 27 (8): p. 676-81.
23. Salminen H, Öhman E, Stenfors-Hayes T. Medical students' feedback regarding their clinical learning environment in primary healthcare: a qualitative study. *BMC Medical Education*, 2016. 16 (1): p. 313.