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Use of a problem-based learning approach to change Japanese physicians' attitudes to learning primary care: a qualitative study

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4 Use of a problem-based learning approach to change Japanese physicians' attitudes to learning primary
5 care: a qualitative study
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ABSTRACT

Objective

To evaluate changes in learning attitudes of primary care physicians.

Design

Qualitative study of a focus group interview using the Steps for Coding and Theorization (SCAT) method.

Setting

Japan.

Participants

Eight primary care physicians who completed a 2-year continuing professional development (CPD) program using a problem-based learning (PBL) approach, focused on acquiring the skills needed to practice as primary care physicians in the community.

Results

Participants described positive changes in their attitudes and behaviors as a result of the training program. These changes were grouped into three main themes: “changes in learning methods regarding medical practice,” “encounters with diverse perspectives and values, and confidence gained from those encounters,” and “showing one’s attitude towards learning and its influence on others.” The experienced practitioners participating in this study reported that the program helped them apply their skills more broadly; for example, searching the literature for psychosocial aspects of practice and engaging more comfortably with diverse perspectives. They reported the positive impact of their learning on others with whom they were working.

Conclusion

A 2-year CPD program using PBL can influence primary care physicians’ attitudes and learning-related behaviors. Further research is needed to determine which specific aspects of the program are the most effective and whether the changes in attitudes and behaviors described affect patient care.

KEYWORDS: primary care, learning attitudes, qualitative, continuing professional development (CPD), problem-based learning.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- This study examined changes in learning attitudes among primary care physicians following a CPD program.
- This study had a small sample size.
- The study was a single focus group interview involving all participants, which was conducted four years ago.
- It is unclear whether changes in learning attitudes among participants have led to improved quality of patient care.

For peer review only

INTRODUCTION

Medical education continues from undergraduate education to continuing professional development (CPD), with doctors working in various roles as practitioners, researchers, and teachers.[1] CPD responds not only to the development of the doctors' personal professional development, but also the needs of patients, their families, and their community.[2] Family medicine and primary care are disciplines that provide long-term care centered on people of all ages and situations.³ It is comprehensive, continuing from pre-natal care to palliative care.[3] No training program – regardless of its duration or content – can provide the postgraduate medical trainee with all competencies needed for primary care.³ Primary care physicians need to commit to life-long learning with a deliberate CPD plan to practice with an expert level of clinical skills.[4]

General practitioners (GPs) in Japan may become family practitioners or hospitalists.[5] Approximately one-third of physicians in Japan are in charge of primary care at their own private clinic after 5–10 years of specialist practice training at university hospitals or city general hospitals.[6] Many physicians do not have public primary care training but independently undertake learning and training in this area. Unlike physicians in many other countries, they do not need to participate in a specific CPD program on primary care to maintain licensure.[7] The Japan Primary Care Association, established in 2010, is responsible for board certification of senior residents who complete their training program.[5, 8] The Japanese Medical Specialty Board (distinct from the Japan Primary Care Association) was newly established in 2017 to manage the certification of GPs in Japan.[5] Board-certified GPs were recognized as a new specialist category under a board certification senior resident training program that began in 2018.[8, 9] Although an education program for senior residents is now in place, educational support for veteran primary care physicians whose training was focused on specific organ systems is inadequate. Therefore, we considered that the CPD of primary care physicians in Japan should be supported.

We started a 2-year Family Medicine Brush-up Program in April 2016, which is an interactive CPD program for primary care physicians with a problem-based learning (PBL) approach. The program aimed to enable participants to discuss and learn about issues encountered in primary care by studying scenarios based on themes such as those found in Appendix 1.[10] We conducted a qualitative study to clarify participants' training needs and inform the program content.[10] Three categories of participant statements were established: “no standard re-education program for primary care physicians to respond to changes in the clinical and practice setting,” “problems with undergraduate and postgraduate medical education in primary care,” and “content of primary care CPD.”[10] This study led to the need to examine the changes that participants experienced as a result of the program.[10] CPD programs such as our Family Medicine Brush-up Program are often assessed with the Kirkpatrick model.[1, 11] Ideally, a CPD program for physicians should be assessed for its

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4 effects on Kirkpatrick level 4 patients. Assessment of the effects on level 4 patients is hindered by
5 factors such as the education effects requiring time to become apparent and the large number of
6 confounders.[1] A study regarding CPD programs has suggested that a PBL approach can improve
7 physicians' performance and patient care.[12, 13] In addition, team-based CPD activities, consistent
8 with the nature of our program, are considered to elicit positive responses from participants, and
9 positive changes in their awareness and attitudes, views of teamwork, and knowledge and
10 collaboration skills.[14] Thus, the study demonstrated the effects of team-based CPD activities
11 corresponding to levels 1, 2a, and 2b in the Kirkpatrick model. However, few studies have reported
12 results related to individual behavior, organizational practice, or benefits to patients. Changes reported
13 in previous studies include positive changes in interactions among individual practitioners (level 3),
14 positive changes in team-based referral practice and work style, and increased motivation regarding
15 organizational improvement (level 4a).[14] However, it is unclear whether participation in our
16 program yields the same changes in learners as in previous studies.

17
18 Therefore, we surveyed participants in our program to examine the changes they
19 experienced in their attitudes to learning, corresponding to levels 2 and 3 of the Kirkpatrick model.
20 We chose not to directly assess organizational changes and patient outcomes, which correspond to
21 level 4, given the difficulty in surveying the medical staff and patients at the participants' workplaces.
22 Interview surveys, considered appropriate for assessing Kirkpatrick model level 3, can also be used to
23 assess items relevant to level 2-equivalent learning.[1] We chose to conduct a qualitative study based
24 on interviews with participants, aiming to clarify how our program changed the attitudes to learning.

25 26 27 28 29 30 31 32 33 34 35 36 **METHODS**

37 **Study design and participants**

38
39 On completion of the program (January 2018), we conducted a single focus group interview
40 with program participants to investigate the changes that had occurred during the program. Interviews
41 are considered effective for assessing changes in behavior and correspond to Kirkpatrick level 3.[1,
42 14, 15]

43
44 Eight participants completed the Family Medicine Brush-up Program targeting physicians
45 who had not undertaken specialist training in family medicine and had qualified at least 10 years
46 previously. The interview was conducted at the end of the program with the eight physicians (A–H,
47 Table 1). This study was approved by the Institutional Review Board of the Jikei University School
48 of Medicine (Study number: 27-277[8162]). All participants provided written informed consent to
49 participate in this study. The results were presented following the COREQ guidelines for reporting
50 qualitative studies[16] (Appendix 2).

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57 Table 1. Attributes of participants

| | Age | Sex | Setting | Medical specialty |
|---|-----|-----|-----------------------|--|
| A | 50s | M | Private clinic | Cardiology |
| B | 40s | M | Private clinic | Emergency medicine |
| C | 30s | M | City general hospital | Rheumatology and connective tissue disease |
| D | 30s | F | City general hospital | Internal medicine |
| E | 30s | F | Private clinic | General medicine and primary care |
| F | 40s | F | University hospital | General medicine and primary care |
| G | 40s | M | City general hospital | Internal medicine |
| H | 40s | F | Private clinic | Anesthesiology |

Data collection

The participants received an explanation of how to record and conduct the interview, and consented to be interviewed. The focus group interview was conducted with the guiding questions: 1) “What kind of changes do you have in your awareness and behavior after taking this program?”; and 2) “Do you notice any change in the behavior or attitude of staff at your workplace?”

The participants were interviewed in a quiet room undisturbed by daily activities, using a digital recorder. Three authors (MS, YF, and TJ), all primary care physicians, managed the interviews. YF had the most experience with interviewing and was therefore the main interviewer, with MS and TJ assisting and make field notes. These three authors had also managed the program and facilitated the participants’ learning over the past 2 years.

The interview time was set to 60 minutes. When one participant responded to a question, several others typically added their opinions. YF asked all the participants questions using the guide questions in chronological order and encouraged participants with relatively few responses to provide additional opinions. In actuality, the interview took 72 minutes. At that point, the interviewer agreed that theoretical saturation had been achieved without any further opinions from the participants.

Data analysis

We analyzed the interview records with the Steps for Coding and Theorization (SCAT) method.[17] SCAT is an analytical method that adds codes in a four-step process, from raw interview data to themes (Table 2).[17, 18] We used this method when conducting a previous study on the needs of participants for the program.[10] SCAT is suitable for the analysis of relatively small samples, such as those used in the previous study, and it was considered appropriate to use SCAT for this study of similarly small samples.[17] Using the tape transcription, two authors (MS and TJ) independently coded the text for SCAT Steps 1 to 3.[17] The two authors conferred about conflicting opinions about the content of the code until they reached a joint consensus. Three authors (MS, TJ, and HO) independently conducted the coding for SCAT Step 4.[17] The three authors again conferred and agreed on common themes and constructs about the content of the code. Transcripts were not returned to participants, and we did not provide feedback on the findings.

Table 2. Four steps following the SCAT (Steps for Coding and Theorization) method

| | Analysis procedure | Examples |
|--------|---|---|
| Step 0 | Raw interview data | "I was able to learn systematically, not only biomedical issues but also psychosocial ones, by finding learning topics in scenarios, searching for literature, and considering it logically." |
| Step 1 | Notable words in Step 0 | "learn systematically," "biomedical issues," "psychosocial ones," "searching for literature," "consider logically" |
| Step 2 | Words that are not in the data to paraphrase Step 1 | Principles of family medicine, critical thinking |
| Step 3 | Words to explain Step 2 | Experience of being able to apply evidence-based learning methods that were applicable to biological problems to psychosocial problems |

| | | |
|--------|-----------------------|--|
| Step 4 | Themes and constructs | Changes in learning methods regarding medical practice that emerge from Step 3 |
|--------|-----------------------|--|

Patient and public involvement

There was no patient or public involvement in the design or carrying out of this study.

RESULTS

The participants' interview records were organized into three categories: "changes in learning methods regarding medical practice," "encounters with diverse perspectives and values, and confidence gained from those encounters," and "showing one's attitude towards learning and its influence on others" (Table 3). This section presents excerpts from focus group interviews on these categories.

Table 3. Themes and constructs about changes in behaviors

| Themes and constructs | Phrases |
|--|--|
| Changes in learning methods regarding medical practice | Psychosocial problem, search for material and literature. |
| Encounters with diverse perspectives and values, and confidence gained from those encounters | Confidence, tolerance of diversity, no judgment attitude for another's opinion, loneliness about own practice, no standard re-education program. |
| Showing one's attitude towards learning and its influence on others | Active transformation of colleagues' learning motivation. |

Changes in learning methods regarding medical practice

"I had never given much thought to my routine practice before, but the program made me dig deeper again into questions such as what guidelines said and what kind of literature there was." (B)

"Now I search not only for secondary materials but also primary materials." (C, D)

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5 “All of us in the program gave presentations and had discussions based on statistics we looked up for
6
7 ourselves.” (G)

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10 “I was able to learn systematically, not only biomedical issues but also psychosocial ones, by finding
11
12 learning topics in scenarios, searching for literature, and considering it logically.” (A)

13 14 15 **Encounters with diverse perspectives and values, and confidence gained from those encounters**

16
17 “I felt like I would be judged for my presentation, but there was no critical atmosphere around
18
19 presentations at all. It was an environment where I could research my learning topic freely and get
20
21 feedback from everyone.” (D)

22
23 “I recognized that it’s not really about whether someone is right or wrong, but that maybe there can
24
25 be all kinds of physicians.” (E)

26
27 “I dove right into practicing family medicine without training in it. I had no confidence in myself, and
28
29 I worried about what I should do and how I should study. The first thing that changed in me through
30
31 participating in this program was meeting all kinds of physicians and encountering many ways of
32
33 living. The program reminded me of the truth of how enjoyable it is to learn, even though my daily
34
35 work as a physician is overwhelming, to think hard about my next own learning topic and compare it
36
37 with what I actually see in my own patients.” (H)

38
39 “In the clinic, in my position as the manager, even when I get lonely or worry about my relationships
40
41 with my staff, I have no one to turn to for advice where my clinic is located. The only choice I ever
42
43 had was to sort things out in my own head. However, by going to a place far away from my clinic and
44
45 opening up to the people I met there, I learned that I’m not the only one who feels lonely.” (H)

46
47 “I have the impression that the level of learning varies quite a bit depending on how much someone
48
49 opens themselves up.” (C)

50 51 **Showing one’s attitude towards learning and its influence on others**

52
53 “My staff told me that seeing me hard at work researching issues between examinations showed them
54
55 that it’s possible to learn even when you’re busy. They said that when they saw how I studied, it made
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57 them want to work harder too.” (H)

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5 “I now make it a point to tell all of my staff everything I learned about in this program. I make sure to
6
7 jot down what I learned and put it up in the meeting room.” (A)
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9
10 “For instance, I have the staff at my clinic actually write out genograms based on what I learn from
11
12 my patients. I think it’s given my staff the ability to look at things from the perspective of the families
13
14 and lifestyles of our patients.” (A)
15

16 **DISCUSSION**

17
18 The first behavioral change that emerged in the participants’ statements was a change in
19
20 learning method. Our PBL approach yielded results for the participants’ learning similar to those in
21
22 previous studies. One participant stated that their literature searches and logical reasoning had changed
23
24 not only regarding biological issues, but also psychosocial issues. Psychosocial problem-solving is a
25
26 core competence in family medicine and primary care.[19] The participants in our program have a
27
28 great deal of practical experience as specialists of different organs and are well-versed in literature
29
30 searches and logical reasoning for biological issues. In addition to this capacity, our results suggested
31
32 that completing our program may help participants acquire literature search and logical reasoning
33
34 capacities for psychosocial issues.

35
36 The second behavioral change that emerged was related to encounters with diverse
37
38 perspectives and values and the confidence gained from those encounters. As previous studies have
39
40 found, the absence of re-education programs often leads to learning in a solitary environment.[6, 20]
41
42 In Japan, many private physicians engaged in primary care have solo practices.[21] By providing
43
44 participants with an arena for learning, our program may have encouraged positive changes in the
45
46 participants’ attitudes. However, it is unclear whether adopting a PBL approach is what led to the
47
48 positive changes. Providing an arena for learning and forming a learning community may be important,
49
50 regardless of learning style. Further study is necessary to determine whether confidence, a specific
51
52 change in the participants’ attitudes, results from the learning format.

53
54 Participants spoke favorably about our program being held away from the locations where
55
56 they practice. However, for physicians in rural areas, traveling to such programs is often considered
57
58 an obstacle to participation.[13] Holding programs online facilitates participation from remote areas.
59
60 In comparisons of online and on-site education, results are mixed.[22] One participant in the present
study stated that it is difficult to consult with other medical professionals in her own community about
issues encountered with patients. For learning about content highly relevant to the participants’
practices, providing a learning community away from the areas where they practice may foster better
learning. However, given the current COVID-19 pandemic, hosting the program online would reduce
the risk of infection. Further study is necessary to determine whether an online program would yield

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5 the same results.

6 Another participant in our study noted that discussions regarding the results of learning
7 topics and participants' practices and values did not lead to a judgmental atmosphere. A positive
8 atmosphere in classes and groups is considered to bring about cooperative learning, while positive
9 discussions and a learner culture are thought to diversify learning, encourage flexible thinking, and
10 increase creativity.[23] In East Asia, the learning style in medical education is based on Confucian
11 culture.[24] The communication style is expressed as "cultural reticence"[25] – a tendency to not
12 actively express what you know or feel.[25] Relevant to the comment that the level of learning may
13 change depending on the degree to which someone opens themselves up, the program facilitator was
14 called upon to provide a safe discussion atmosphere in which the participants' presentations would
15 not be judged as right or wrong and which promoted self-disclosure. Currently, no formal training
16 exists for such facilitators. Going forward, training to help facilitators promote discussion should be
17 conducted while the program is administered.

18 The last behavioral change was the influence on others. Few studies have demonstrated that
19 participation in a program such as ours leads to behaviors that improve organizational care.[15] The
20 present study suggested that program participants can promote a positive attitude towards learning in
21 their workplace staff and others around them by demonstrating their own attitude towards learning
22 and sharing what they have learned. In East Asia, where Confucian influences are strong, students
23 respect teachers, learn from them, and imitate their attitudes.[24] Such a cultural background may also
24 improve the learning attitude of the workplace staff. However, it is unclear whether staff actually put
25 their learning into practice in patient care. Further examination of the effects of learning programs will
26 require surveys of the participants' staff and confirmation of changes in patient care.

27 28 29 30 31 32 33 34 35 36 37 38 39 **Limitations**

40 Although our program took place over 2 years, one participant dropped out after only 1 year.
41 Participation in the program was no longer possible because of changes in the medical practice hours.
42 The interview in the present study may not necessarily reflect all changes in the attitudes to learning
43 among the program participants, and it would also have been helpful to include the views of the non-
44 completing participant.

45 This study is an analysis of a single focus group interview with all participants who
46 completed the program. It is unclear whether multiple focus group interviews with the participants
47 would have yielded similar results. Future research will require multiple focus groups with larger
48 numbers of participants.

49 The interview was conducted by facilitators who had been involved with the program for its
50 2-year duration. Close involvement in the learning process may have enabled the facilitators to
51 encourage deeper discussion than an interviewer without such involvement. Conversely, the
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4 involvement of the interviewers in the learning process may have influenced the discussion about the
5 effective outcomes of the program, as participants might not have wanted to offend the facilitators.
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8 9 **CONCLUSIONS**

10 This study confirmed that participation in our 2-year CPD program changed participants'
11 learning attitudes and education-related behavior. Our results suggest that support of CPD for primary
12 care physicians requires the preparation of a learning community based on diverse values and
13 perspectives, and the capacity for facilitation to foster the learning community.
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16

17 18 **ACKNOWLEDGMENTS**

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21
22

23 24 **STATEMENTS**

25 **Contributorship statement**

26 MS conceived the study, contributed to the development of its design, received the JSPS KAKENHI
27 grant, collected the data, and analyzed the qualitative data. YF conceived the study, contributed to the
28 development of the design and interviewed the participants. MM conceived the study, contributed to
29 the design, and facilitated the focus group interview. TJ facilitated the focus group interview and
30 analyzed the qualitative data. HO analyzed the qualitative data and contributed to the design. YM, IO
31 and JH conceived the study and contributed to the design. All authors contributed to the drafting of
32 the manuscript, and read and approved the final manuscript.
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40 **Competing interests**

41 MM received lecture fees and lecture travel fees from the Centre for Family Medicine Development
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43 Family Medicine Development Practice-Based Research Network. The other authors report no conflict
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45
46
47
48

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Data sharing statement

Because of the nature of this study, participants did not agree that their data could be shared publicly, so supporting data are not available.

Patient consent for publication

Not required

Ethics approval

This study was approved by the Institutional Review Board of the Jikei University School of Medicine (Study number: 27-277[8162]).

Provenance and peer review

Not commissioned; externally peer reviewed.

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APPENDIX 1

Primary care themes covered in the Family Medicine Brush-up Program

I. Typical health problems in primary care

| | | |
|----------------------|------------------------|-------------------------|
| Child – old age care | Palliative care | Women’s health |
| Rehabilitation | Mental health problems | Vaccination |
| Chinese medicine | Common emergencies | Musculoskeletal problem |
| Surgery | Ophthalmology | Otorhinolaryngology |

II. The principles of family medicine

| | | |
|-----------------------------------|------------------------|--------------------------------|
| Patient-centered clinical method | Family-oriented care | |
| Biopsychosocial model | Interprofessional work | |
| Prevention and health promotion | Ethics and law | Patient-clinician relationship |
| Healthcare context and continuity | Behavior modification | |
| Complexity and uncertainty | Reflective learning | |

III. Interpersonal and communication skills

| | |
|--------------------------|------------------------------------|
| Medical interview | Laboratory tests in the clinic |
| Clinical problem solving | Evidence-based medicine |
| Professionalism | Minorities and socially vulnerable |
| Facility management | Practice guidelines |

APPENDIX 2

Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

| No | Item | Guide questions/description |
|--|-------------------------|---|
| Domain 1: Research team and reflexivity | | |
| Personal Characteristics | | |
| 1. | Interviewer/facilitator | Which author/s conducted the interview or focus group? Yasuki Fujinuma conducted the focus group interview. Masayasu Seki and Tatsuhiro Joki assisted. Page 6. Masayasu Seki, MD, PhD Yasuki Fujinuma, MD Masato Matsushima, MD, PhD, MPH Tatsuhiro Joki, MD, PhD Hideo Okonogi, MD, PhD Yasuhiko Miura, MD, PhD |
| 2. | Credentials | What were the researchers' credentials? <i>E.g., PhD, MD</i> Jun Hiramoto, MD, PhD Iwao Ohno, MD, PhD. Page 1. |

| No | Item | Guide questions/description | |
|--------------------------------|--|---|---|
| 3. | Occupation | What was their occupation at the time of the study? | All researchers were primary care physician. Page 1. |
| 4. | Gender | Was the researcher male or female? | All researchers were male. Page 1. |
| 5. | Experience and training | What experience or training did the researcher have? | We conducted this research using the same analysis as for a previous study. Page 4. |
| Relationship with participants | | | |
| 6. | Relationship established | Was a relationship established prior to study commencement? | Participants were interviewed after taking the Family Medicine Brush-up Program for two years. Interviewers facilitated the program. Page 5, 6. |
| 7. | Participant knowledge of the interviewer | What did the participants know about the researcher? e.g., | The participants received an explanation of the taped focus group interview process and gave their consent to participate. Page 5, 6. |

| No | Item | Guide questions/description | |
|-------------------------------|---------------------------------------|---|--|
| | | <i>personal goals, reasons for doing the research</i> | |
| 8. | Interviewer characteristics | What characteristics were reported about the interviewer/facilitator? e.g., <i>Bias, assumptions, reasons and interests in the research topic</i> | The main interviewer (Yasuki Fuchinuma) was practicing primary care and was engaged in research and education activities in family medicine. Page 6. |
| Domain 2: study design | | | |
| | Theoretical framework | | |
| 9. | Methodological orientation and theory | What methodological orientation was stated to underpin the study? e.g., <i>grounded theory, discourse analysis, ethnography,</i> | The content of the interview was analyzed with the Steps for Coding and Theorization (SCAT) method. Page 7. |

| No | Item | Guide questions/description | |
|-----|-----------------------|--|--|
| | | <i>phenomenology, content analysis</i> | |
| | Participant selection | | |
| 10. | Sampling | How were participants selected? <i>e.g., purposive, convenience, consecutive, snowball</i> | Participants were all those who had completed the two-year program. Page 5, 6. |
| 11. | Method of approach | How were participants approached? <i>e.g., face-to-face, telephone, mail, email</i> | Face-to-face. Page 6. |
| 12. | Sample size | How many participants were in the study? | 8 participants. Page 5, 6. |
| 13. | Non-participation | How many people refused to participate or dropped out? Reasons? | None. Page 5, 6. |

| No | Item | Guide questions/description | |
|-----------------|------------------------------|---|--|
| Setting | | | |
| 14. | Setting of data collection | Where was the data collected? <i>e.g., home, clinic, workplace</i> | The participants were interviewed in a quiet room undisturbed by daily activities. Page 6. |
| 15. | Presence of non-participants | Was anyone else present besides the participants and researchers? | No. Page 6. |
| 16. | Description of sample | What are the important characteristics of the sample? <i>e.g., demographic data, date</i> | Eight participants completed the Family Medicine Brush-up Program targeting physicians who had not undertaken specialist training in family medicine and had qualified at least 10 years previously. Page 5. |
| Data collection | | | |
| 17. | Interview guide | Were questions, prompts, guides provided by the authors? Was it pilot tested? | The interview was conducted using the guiding questions and was not pilot tested. Page 6. |

| No | Item | Guide questions/description | |
|-----|------------------------|--|---|
| 18. | Repeat interviews | Were repeat interviews carried out? If yes, how many? | A single focus group interview was conducted. Page 6. |
| 19. | Audio/visual recording | Did the research use audio or visual recording to collect the data? | The interview was audio-recorded using a digital recorder. Page 5. |
| 20. | Field notes | Were field notes made during and/or after the interview or focus group? | Yes. Page 6. |
| 21. | Duration | What was the duration of the interviews or focus group? | 72 minutes. Page 6. |
| 22. | Data saturation | Was data saturation discussed? | Saturation was defined as the point with no new comments from the participants. Page 6. |
| 23. | Transcripts returned | Were transcripts returned to participants for comment and/or correction? | No. Page 7. |

| No | Item | Guide questions/description | |
|--|--------------------------------|---|---|
| Domain 3: analysis and findings | | | |
| Data analysis | | | |
| 24. | Number of data coders | How many data coders coded the data? | Two. Page 7. |
| 25. | Description of the coding tree | Did authors provide a description of the coding tree? | Yes (see results). Page 7, 8. |
| 26. | Derivation of themes | Were themes identified in advance or derived from the data? | Themes were derived from the data. Page 7, 8. |
| 27. | Software | What software, if applicable, was used to manage the data? | Not applicable. Page 7. |
| 28. | Participant checking | Did participants provide feedback on the findings? | No. Page 7. |

| No | Item | Guide questions/description | |
|-----------|------------------------------|--|--|
| Reporting | | | |
| 29. | Quotations presented | Were participant quotations presented to illustrate the themes/ findings? Was each quotation identified? e.g., <i>participant number</i> | Yes, quotations are presented and identified. Page 8, 9. |
| 30. | Data and findings consistent | Was there consistency between the data presented and the findings? | Yes. Page 8, 9. |
| 31. | Clarity of major themes | Were major themes clearly presented in the findings? | Yes. Page 8. |
| 32. | Clarity of minor themes | Is there a description of diverse cases or discussion of minor themes? | Yes. Page 8, 9. |

APPENDIX 2

Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

| No | Item | Guide questions/description |
|--------------------------------------|-------------------------|---|
| Domain 1: | | |
| Research team and reflexivity | | |
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| No | Item | Guide questions/description | |
|--------------------------------|--|---|---|
| 3. | Occupation | What was their occupation at the time of the study? | All researchers were primary care physician. Page 1. |
| 4. | Gender | Was the researcher male or female? | All researchers were male. Page 1. |
| 5. | Experience and training | What experience or training did the researcher have? | We conducted this research using the same analysis as for a previous study. Page 4. |
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| 7. | Participant knowledge of the interviewer | What did the participants know about the researcher? e.g., | The participants received an explanation of the taped focus group interview process and gave their consent to participate. Page 5, 6. |

| No | Item | Guide questions/description | |
|-------------------------------|---------------------------------------|---|--|
| | | <i>personal goals, reasons for doing the research</i> | |
| 8. | Interviewer characteristics | What characteristics were reported about the interviewer/facilitator? e.g., <i>Bias, assumptions, reasons and interests in the research topic</i> | The main interviewer (Yasuki Fuchinuma) was practicing primary care and was engaged in research and education activities in family medicine. Page 6. |
| Domain 2: study design | | | |
| | Theoretical framework | | |
| 9. | Methodological orientation and theory | What methodological orientation was stated to underpin the study? e.g., <i>grounded theory, discourse analysis, ethnography,</i> | The content of the interview was analyzed with the Steps for Coding and Theorization (SCAT) method. Page 7. |

| No | Item | Guide questions/description | |
|-----------------------|--------------------|--|--|
| | | <i>phenomenology, content analysis</i> | |
| Participant selection | | | |
| 10. | Sampling | How were participants selected? <i>e.g., purposive, convenience, consecutive, snowball</i> | Participants were all those who had completed the two-year program. Page 5, 6. |
| 11. | Method of approach | How were participants approached? <i>e.g., face-to-face, telephone, mail, email</i> | Face-to-face. Page 6. |
| 12. | Sample size | How many participants were in the study? | 8 participants. Page 5, 6. |
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|--|--------------------------------|---|---|
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BMJ Open

Use of a 2-year continuing professional development program to change Japanese physicians' attitudes to learning primary care: a qualitative study

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| | |

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6 Use of a 2-year continuing professional development program to change Japanese physicians'
7 attitudes to learning primary care: a qualitative study
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9

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11 Yasuhiko Miura¹, Iwao Ohno¹, Jun Hiramoto¹
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ABSTRACT

Objective

To evaluate changes in the learning attitudes of primary care physicians.

Design

Qualitative study of a focus group interview using the Steps for Coding and Theorization (SCAT) method.

Setting

Japan.

Participants

Eight primary care physicians who completed a 2-year continuing professional development (CPD) program using a problem-based learning (PBL) approach, focused on acquiring the skills needed to practice as primary care physicians in the community.

Results

Participants described positive changes in their attitudes and behaviors as a result of the training program. These changes were grouped into three main themes: “changes in learning methods regarding medical practice,” “encounters with diverse perspectives and values, and confidence gained from those encounters,” and “showing one’s attitude towards learning and its influence on others.” The experienced practitioners participating in this study reported that the program helped them apply their skills more broadly; for example, searching the literature for psychosocial aspects of practice and engaging more comfortably with diverse perspectives. They reported the positive impact of their learning on their co-workers.

Conclusion

A 2-year CPD program using PBL can influence primary care physicians’ attitudes and learning-related behaviors. Further research is needed to determine which specific aspects of the program are the most effective and whether the changes in attitudes and behaviors described affect patient care.

KEYWORDS: primary care, learning attitudes, qualitative, continuing professional development (CPD), problem-based learning.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- This study evaluated a Family Medicine Brush-up Program that was implemented as a CPD program for experienced primary care physicians.
- This study examined changes in learning attitudes of the Kirkpatrick model level 3 among primary care physicians following a 2-year CPD program.
- This study had a small sample size and was a single focus group interview conducted in 2018.
- It is unclear whether changes in learning attitudes among participants have led to improved quality of patient care.
- Bias may have occurred due to the fact that the program facilitator was the main interviewer.

INTRODUCTION

Medical education continues from undergraduate education to continuing professional development (CPD), with doctors working in various roles as practitioners, researchers, and teachers [1]. CPD responds not only to the development of the doctors' personal professional development, but also to the needs of patients, their families, and their community [2]. Family medicine and primary care are disciplines that provide long-term care centered on people of all ages and situations [3]. It is comprehensive, continuing from pre-natal care to palliative care [3]. No training program – regardless of its duration or content – can provide the postgraduate medical trainee with all competencies needed for primary care [3]. Primary care physicians need to commit to lifelong learning with a deliberate CPD plan to practice with an expert level of clinical skills [4].

General practitioners (GPs) in Japan may become family practitioners or hospitalists [5]. Approximately one-third of physicians in Japan are in charge of primary care at their own private clinic after 5–10 years of specialist practice training at university hospitals or city general hospitals [6]. Many physicians do not have public primary care training but independently undertake learning and training in this area. Unlike physicians in many other countries, they do not need to participate in a specific CPD program on primary care to maintain licensure [7]. The Japan Primary Care Association, established in 2010, is responsible for board certification of senior residents who complete their training program [5, 8]. The Japanese Medical Specialty Board (distinct from the Japan Primary Care Association) was newly established in 2017 to manage the certification of GPs in Japan [5]. Board-certified GPs were recognized as a new specialist category under a board certification senior resident training program that began in 2018 [8, 9]. Although an education program for senior residents is now in place, educational support for veteran primary care physicians, whose training was focused on specific organ systems, is inadequate. Therefore, we consider that the CPD of primary care physicians in Japan should be supported.

In April 2016, we started a 2-year Family Medicine Brush-up Program, which is an interactive CPD program for primary care physicians with a problem-based learning (PBL) approach. The program aimed to enable participants to discuss and learn about issues encountered in primary care by studying scenarios based on themes such as those found in Appendix 1 [10]. Through the program, we aimed to develop the ability to identify problems in the practice of medicine and to continue learning to solve them. The PBL approach allows learners to actively participate in group activities and helps learners develop into reflective practitioners [11]. The field of primary care is fraught with complex problems and uncertainties that make it difficult to arrive at a single correct management pathway [12]. We believe that primary care physicians who grow through repeated reflection have a strong affinity with lifelong learning, and for this reason we have adopted the PBL approach for this program. We conducted a qualitative study to clarify participants' training needs and

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6 inform the program content [10]. Three categories of participant statements were established: “no
7
8 standard re-education program for primary care physicians to respond to changes in the clinical and
9
10 practice setting,” “problems with undergraduate and postgraduate medical education in primary care,”
11
12 and “content of primary care CPD” [10]. This study led to the need to examine the changes that
13
14 participants experienced as a result of the program [10]. After the 2-year program that started in 2016
15
16 was completed, we considered evaluating the program to see how the participants had changed.

17
18 The Kirkpatrick model is used to evaluate educational programs, including CPD programs
19
20 such as our Family Medicine Brush-up Program [1, 13]. The model focuses on the outcomes of the
21
22 program, not just learner satisfaction [14]. The Kirkpatrick model was proposed in the 1950s, and a
23
24 modified model (The New World Kirkpatrick model) was introduced in the 2000s [13]. The model
25
26 consists of four levels [1, 11]. Level 1 is reaction and satisfaction: Do learners respond favorably to
27
28 the program? Level 2 is learning measures: Do learners acquire the intended knowledge? Level 3 is
29
30 behavioral change: Do learners apply what they learned? Level 4 is results and impact: Do the expected
31
32 outcomes occur? [1, 13, 14]. The evaluation of how the participants’ learning changed is equivalent
33
34 to level 3 in this model. Related to the evaluation of level 3 in this model, a review by Samuel et al.
35
36 reported outcomes that affected health care practitioners’ behavioral changes and patient outcomes
37
38 [15]. In this review, changes in prescribing patterns and modification of test ordering behavior are
39
40 discussed in terms of level 3 outcomes [15]. Most of the findings reported at level 4 of the Kirkpatrick
41
42 model were not statistically significant [15]. Online learning, e-learning, and computer-aided learning
43
44 are reported as effective modalities for CPD to achieve the learning objectives, and interventions such
45
46 as lectures, interactive sessions, audits, and feedback were also used [15]. In terms of the educational
47
48 approach used in CPD, Al-Azri et al. and Dowling et al. reported that a PBL approach can improve
49
50 physicians’ performance and patient care [16, 17]. A variety of modalities and interventions have been
51
52 used for CPD [15]. Traditional face-to-face lectures are preferred by many participants, and there are
53
54 no set recommendations for CPD modalities and interventions [15]. It is also unclear whether
55
56 participation in our program yields the same changes in learners as those reported in previous studies.

57
58 Therefore, we surveyed participants in our program to examine the changes they
59
60 experienced in their attitudes to learning, corresponding to Kirkpatrick level 3. It is helpful to use an
interview survey and portfolio to evaluate the behavioral change corresponding to level 3 of this model
[1, 13]. To elicit detailed insights from individual participants, we chose to conduct a qualitative study
based on interviews with participants, aiming to clarify how our program changed their attitudes to
learning.

METHODS

Study design and participants

On completion of the program (January 2018), we conducted a single focus group interview with program participants to investigate the changes that had occurred during the program. Interviews are considered effective for assessing changes in behavior and correspond to Kirkpatrick level 3 [1].

Eight participants completed the Family Medicine Brush-up Program targeting physicians who had not undertaken specialist training in family medicine and had qualified at least 10 years previously. The interview was conducted at the end of the program with the eight physicians (A–H, Table 1). This study was approved by the Institutional Review Board of the Jikei University School of Medicine (Study number: 27-277[8162]). All participants provided written informed consent to participate in this study. The results were presented following the COREQ guidelines for reporting qualitative studies [18] (Appendix 2).

Table 1. Attributes of participants

| | Age | Sex | Setting | Medical specialty |
|---|-----|-----|-----------------------|--|
| A | 50s | M | Private clinic | Cardiology |
| B | 40s | M | Private clinic | Emergency medicine |
| C | 30s | M | City general hospital | Rheumatology and connective tissue disease |
| D | 30s | F | City general hospital | Internal medicine |
| E | 30s | F | Private clinic | General medicine and primary care |
| F | 40s | F | University hospital | General medicine and primary care |
| G | 40s | M | City general hospital | Internal medicine |
| H | 40s | F | Private clinic | Anesthesiology |

Data collection

The participants received an explanation of how the interview would be recorded and conducted, and consented to be interviewed. The focus group interview was conducted with the

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6 guiding questions: 1) “What kind of changes do you have in your awareness and behavior after taking
7 this program?”; and 2) “Do you notice any change in the behavior or attitude of staff at your
8 workplace?”
9

10 The participants were interviewed in a quiet room undisturbed by daily activities, using a
11 digital recorder. Three authors (MS, YF, and TJ), all primary care physicians, managed the interviews.
12 In this study, we considered it important to use and analyze the interactions generated by group
13 discussions, and adopted the focus group interview method. Focus group interviews are also suitable
14 for investigating attitudes and experiences [19, 20]. This method is reported to encourage people to
15 talk about difficult content and voice critical opinions [19, 20]. In such cases, rather than having a
16 third party act as an interviewer, the authors who run the program and facilitate the participants can
17 act as interviewers to promote group dynamics and elicit discussions among the participants. Therefore,
18 the authors acted as interviewers for the focus group interviews. YF had the most experience with
19 interviewing and was therefore the main interviewer, with MS and TJ assisting. These three authors
20 had also managed the program and facilitated the participants’ learning over the past 2 years.
21

22 The interview time was set at 60 minutes. When one participant responded to a question,
23 several others typically added their opinions. YF asked all the participants questions using the guide
24 questions in chronological order and encouraged participants with relatively few responses to provide
25 additional opinions. In actuality, the interview took 72 minutes. At that point, the interviewer decided
26 that theoretical saturation had been achieved without any further opinions from the participants.
27

28 **Data analysis**

29 We analyzed the interview records with the Steps for Coding and Theorization (SCAT)
30 method, which is a grounded theory-based thematic analysis approach. SCAT is an analytical method
31 that adds codes in a four-step process, from raw interview data to themes (Table 2) [21, 22, 23]. We
32 used this method when conducting a previous study on the needs of participants for the program [10].
33 SCAT is suitable for the analysis of relatively small samples, such as those used in the previous study,
34 and it was considered appropriate to use SCAT for this study with a similarly small sample [21, 23].
35 The SCAT method improves reflexivity by looking back at each step, and can be expected to improve
36 the possibility of falsifiability by clarifying the analysis process [21, 22, 23]. Therefore, the SCAT
37 method was selected as the analysis method of this study. Using the tape transcript, two authors (MS
38 and TJ) independently coded the text for SCAT steps 1 to 3 [21, 23]. The two authors conferred on
39 conflicting opinions about the content of the code until they reached a joint consensus. Three authors
40 (MS, TJ, and HO) independently conducted the coding for SCAT step 4 [21, 23]. The three authors
41 again conferred and agreed on common themes and constructs about the content of the code.
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Table 2. Four steps following the SCAT (Steps for Coding and Theorization) method

| | Analysis procedure | Examples |
|--------|---|---|
| Step 0 | Raw interview data | "I was able to learn systematically, not only biomedical issues but also psychosocial ones, by finding learning topics in scenarios, searching for literature, and considering it logically." |
| Step 1 | Notable words in step 0 | "learn systematically," "biomedical issues," "psychosocial ones," "searching for literature," "consider logically" |
| Step 2 | Words that are not in the data to paraphrase step 1 | Principles of family medicine, critical thinking |
| Step 3 | Words to explain step 2 | Experience of being able to apply evidence-based learning methods that were applicable to biological problems to psychosocial problems |
| Step 4 | Themes and constructs that emerge from step 3 | Changes in learning methods regarding medical practice |

Patient and public involvement

There was no patient or public involvement in the design or implementation of this study.

RESULTS

Although our program took place over 2 years with nine participants enrolled, one participant dropped out after only 1 year because of changes in the participant's medical practice hours. Eight persons completed this program, and all agreed to participate in the interview. The participants' interview records were organized into three categories: "changes in learning methods regarding medical practice," "encounters with diverse perspectives and values, and confidence gained from those encounters," and "showing one's attitude towards learning and its influence on others" (Table 3). This section presents excerpts from focus group interviews on these categories.

Table 3. Themes and constructs about changes in behaviors

| Themes and constructs | Phrases |
|--|---|
| Changes in learning methods regarding medical practice | Search for material and literature, psychosocial problem |
| Encounters with diverse perspectives and values, and confidence gained from those encounters | Confidence, no judgment attitude for another's opinion, tolerance of diversity, loneliness about own practice, no standard re-education program |
| Showing one's attitude towards learning and its influence on others | Active transformation of colleagues' learning motivation |

Changes in learning methods regarding medical practice

The phrases “search for material and literature” and “psychosocial problem” came from a collection of opinions on this theme.

Search for material and literature:

Participants in the program had the opportunity to relearn the practice they normally engage in.

“I had never given much thought to my routine practice before, but the program made me dig deeper again into questions such as what guidelines said and what kind of literature there was.” (B)

Participants emphasized that they searched for raw data, such as statistical data about their learning tasks.

“Now I search not only for secondary materials but also primary materials.” (C, D)

The content of the program, which is to study and discuss the learning topics, has led to changes in search methods.

“All of us in the program gave presentations and had discussions based on statistics we looked up for ourselves.” (G)

Psychosocial problem:

Participants had little experience searching the literature for psychosocial factors.

“I was able to learn systematically, not only biomedical issues but also psychosocial ones, by finding

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6 learning topics in scenarios, searching for literature, and considering it logically.” (A)
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8 **Encounters with diverse perspectives and values, and confidence gained from those encounters**

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10 The phrases “confidence”, “no judgment attitude for another’s opinion”, “tolerance of
11 diversity”, “loneliness about own practice”, “no standard re-education program” came from a
12 collection of opinions on this theme.
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16 Confidence, no judgment attitude for another’s opinion:

17 Setting the learning task in the discussion between the participants led to confidence in the presentation
18 and prevented the attitude of judging the presentation to be correct or incorrect.
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20
21 “I felt like I would be judged for my presentation, but there was no critical atmosphere around
22 presentations at all. It was an environment where I could research my learning topic freely and get
23 feedback from everyone.” (D)
24

25
26 Tolerance of diversity:

27 It is important to understand diversity and not to judge the correct answer or the error unequivocally.
28 The participating doctors also felt this way.
29

30
31 “I recognized that it’s not really about whether someone is right or wrong, but that maybe there can
32 be all kinds of physicians.” (E)
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35 No standard re-education program:

36 The lack of a standard re-education program has led to the burden of engaging in the field of primary
37 care while still immature. It is difficult for such a practitioner to notice the connection.
38

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40 “I dove right into practicing family medicine without training in it. I had no confidence in myself, and
41 I worried about what I should do and how I should study. The first thing that changed in me through
42 participating in this program was meeting all kinds of physicians and encountering many ways of
43 living. The program reminded me of the truth of how enjoyable it is to learn, even though my daily
44 work as a physician is overwhelming, to think hard about my next own learning topic and compare it
45 with what I actually see in my own patients.” (H)
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51 Loneliness about own practice:

52 The loneliness of the participants was due to the fact that they were placed in managerial or
53 administrative positions in the clinic, and it was difficult to find a place to learn with other medical
54 practitioners due to their solo practice.
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57 “In the clinic, in my position as the manager, even when I get lonely or worry about my relationships
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6 with my staff, I have no one to turn to for advice where my clinic is located. The only choice I ever
7 had was to sort things out in my own head. However, by going to a place far away from my clinic and
8 opening up to the people I met there, I learned that I'm not the only one who feels lonely." (H)

9
10 Participants felt less lonely, and dealing with diversity allowed them to open up. As a result, the
11 participants realized the depth of their learning.

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13
14 "I have the impression that the level of learning varies quite a bit depending on how much someone
15 opens themselves up." (C)

16 17 18 19 **Showing one's attitude towards learning and its influence on others**

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21 The phrase "active transformation of colleagues' learning motivation" was contained in this
22 theme.

23 Active transformation of colleagues' learning motivation:

24 Showing a learning attitude is linked to the learning motivation of other colleagues.

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26
27 "My staff told me that seeing me hard at work researching issues between examinations showed them
28 that it's possible to learn even when you're busy. They said that when they saw how I studied, it made
29 them want to work harder too." (H)

30
31 Showing colleagues the learning content increases their motivation to learn. Presenting the learning
32 content is not about planning a study session for colleagues.

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34
35 "I now make it a point to tell all of my staff everything I learned about in this program. I make sure to
36 jot down what I learned and put it up in the meeting room." (A)

37
38 Having colleagues know what the participants have learned is linked not only to their motivation for
39 learning but also to their behavior related to actual medical care.

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41
42 "For instance, I have the staff at my clinic actually write out genograms based on what I learn from
43 my patients. I think it's given my staff the ability to look at things from the perspective of the families
44 and lifestyles of our patients." (A)

45 46 47 48 49 50 **DISCUSSION**

51
52 The first behavioral change that emerged in the participants' statements was a change in
53 learning method. One participant stated that their literature searches and logical reasoning had changed
54 regarding not only biological issues, but also psychosocial issues. Psychosocial problem-solving is a
55 core competence in family medicine and primary care [24]. The participants in our program have a
56 great deal of practical experience as specialists of different organs and are well-versed in literature
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6 searches and logical reasoning for biological issues. In addition to this capacity, our results suggested
7 that completing our program may help participants acquire literature search and logical reasoning
8 capacities for psychosocial issues.
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10 The second behavioral change that emerged was related to encounters with diverse
11 perspectives and values and the confidence gained from those encounters. As previous studies have
12 found, the absence of re-education programs often leads to learning in a solitary environment [6, 25].
13 In Japan, many private physicians engaged in primary care have solo practices [26]. By providing
14 participants with an arena for learning, our program may have encouraged positive changes in the
15 participants' attitudes. Providing an arena for learning and forming a learning community may be
16 important, regardless of learning style. Further study is necessary to determine whether confidence, a
17 specific change in the participants' attitudes, results from the PBL approach.
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20 Participants spoke favorably about our program being held away from the locations where
21 they practice. However, for physicians in rural areas, traveling to such programs is often considered
22 an obstacle to participation [17]. Holding programs online facilitates participation from remote areas.
23 In comparisons of online and on-site education, results are mixed [27]. One participant in the present
24 study stated that it is difficult to consult with other medical professionals in her own community about
25 issues encountered with patients. For learning about content highly relevant to the participants'
26 practices, providing a learning community away from the areas where they practice may foster better
27 learning. However, given the current COVID-19 pandemic, hosting the program online would reduce
28 the risk of infection. Additionally, health care utilization in Japan has changed. Aoki et al. highlighted
29 the need to strengthen primary care functions such as support for populations with social isolation and
30 multimorbidity [28]. Further research should consider changing the program to an online format and
31 modifying the primary care learning topics to be covered.
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34 One participant in our study noted that discussions regarding the results of learning topics
35 and participants' practices and values did not lead to a judgmental atmosphere. A positive atmosphere
36 in classes and groups is considered to bring about cooperative learning, while positive discussions and
37 a learner culture are thought to diversify learning, encourage flexible thinking, and increase creativity
38 [29]. In East Asia, the learning style in medical education is based on Confucian culture [30]. The
39 communication style is expressed as "cultural reticence" [31] – a tendency to not actively express what
40 you know or feel [31]. Relevant to the comment that the level of learning may change depending on
41 the degree to which someone opens themselves up, the facilitator of learners' presentations and
42 discussions may need skills to provide the learners with a safe discussion atmosphere in which the
43 learners' presentations are not judged as right or wrong and which promotes self-disclosure. Currently,
44 no formal training exists for such facilitators. Going forward, training to help facilitators promote
45 discussion should be conducted while the program is administered.
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58 The last behavioral change was the influence on others. A present study suggests that
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6 program participants can promote a positive attitude towards learning in their workplace staff and
7 others around them by demonstrating their own positive attitude towards learning and sharing what
8 they have learned [32]. In East Asia, where Confucian influences are strong, students respect teachers,
9 learn from them, and imitate their attitudes [30]. Such a cultural background may also improve the
10 learning attitude of the workplace staff. However, it is unclear whether staff actually put their learning
11 into practice in patient care. Further examination of the effects of learning programs will require
12 surveys of the participants' staff and confirmation of changes in patient care.

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16 The Kirkpatrick model was used to evaluate this program [14]. This model is useful because
17 of its clarity in focusing on program outcomes and its clear description of outcomes beyond simple
18 learner satisfaction [14]. However, this model on its own does not provide educators with a complete
19 evaluation of their educational programs [14, 33]. The model has been criticized on the grounds that
20 it does not include intervening variables, such as motivation and learner's entry level, and the
21 relationship between program elements and context [14, 34, 35]. In this interview, a participant
22 commented on the importance of a non-judgmental atmosphere. It is necessary to investigate the
23 intervening variables that have affected prior learning, and then conduct interviews with the
24 intervening variables in mind regarding changes in behavior in the study group.

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30 In terms of the three changes in attitude, we will consider whether attending this program
31 was an effective learning exercise for the participants. The FAIR principles (Feedback, Activity,
32 Individualization, and Relevance) are known to be associated with effective learning [36]. The points
33 of Activity and Individualization are achieved by the use of small groups and a learning strategy in
34 which the learner selects the learning theme using the PBL approach. In addition, the point of
35 Relevance is also satisfied by using a scenario that assumes the site of primary care. Under the
36 conditions of a solo medical practice and learning environment, and with self-judgment of the
37 correctness of learning tasks, appropriate feedback cannot be obtained from facilitators and other
38 participants. The interview results suggest that participating with confidence among participants with
39 a diverse set of values in a non-judgmental environment provided sufficient feedback. Additionally,
40 providing appropriate feedback is one of the competencies required as an educator [37]. Acting as a
41 facilitator is one of the twelve roles of the educator, and feedback is included in this role. The third
42 attitude change applies to participants being viewed as role models. Studying in this program may also
43 enhance participants' ability to support other learners as a faculty member. By observing how
44 participants behave as facilitators or role models in clinical and learning settings, it may be possible
45 to assess level 4 stages of the Kirkpatrick model for this program. This aspect could be a subject for
46 future research. The Kirkpatrick model was used to evaluate this program, but we aimed for an
47 evaluation that went beyond the satisfaction of taking the course. For this reason, the evaluation was
48 set at level 3 instead of 1 or 2. However, we did not evaluate the level 4 stage, which extends to how
49 the program affected patients. Measuring outcomes in terms of patient health and medical economy
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6 may be a future research topic for the CPD program. This would require a survey of individual patients'
7 illnesses and health conditions, as well as a survey of management conditions. The outcomes should
8 also investigate what changes have occurred in the staff of the medical institutions to which the
9 participants belong, using the participants as role models.
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13 **Limitations**

14 The interview in the present study may not necessarily reflect all changes in the attitudes to
15 learning among the program participants. It would also have been helpful to include the views of the
16 participant who did not complete the program.
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19 This study is an analysis of a single focus group interview with all participants who
20 completed the program. Although the participants are experienced primary care physicians, they do
21 not all have the same level of medical competence and knowledge on the themes of health problems
22 that are addressed in primary care. In addition, the level of their medical skills and knowledge was not
23 verified beforehand. It is possible that changes in the learning attitude of each participant may have
24 been overestimated or underestimated. Future research will require multiple focus groups with larger
25 numbers of participants divided by their subspecialty.
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30 The interview was conducted by facilitators who had been involved with the program for its
31 2-year duration. Close involvement in the learning process may have enabled the facilitators to
32 encourage deeper discussion than an interviewer without such involvement. Conversely, the
33 involvement of the interviewers in the learning process may have influenced the discussion about the
34 effective outcomes of the program, as participants might not have wanted to offend the facilitators.
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39 **CONCLUSIONS**

40 This study confirmed that participation in our 2-year CPD program changed participants'
41 learning attitudes and education-related behavior. Our results suggest that support of CPD for primary
42 care physicians requires the preparation of a learning community based on diverse values and
43 perspectives, and the capacity for facilitation to foster the learning community.
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50 manuscript and helping to draft the abstract.
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STATEMENTS

Contributors

MS conceived the study, contributed to the development of its design, received the JSPS KAKENHI grant, collected the data, and analyzed the qualitative data. YF conceived the study, contributed to the development of the design, and interviewed the participants. MM conceived the study, contributed to the design, and facilitated the focus group interview. TJ facilitated the focus group interview and analyzed the qualitative data. HO analyzed the qualitative data and contributed to the design. YM, IO, and JH conceived the study and contributed to the design. All authors contributed to the drafting of the manuscript, and read and approved the final manuscript.

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Competing interests

MM received lecture fees and lecture travel fees from the Centre for Family Medicine Development of the Japanese Health and Welfare Co-operative Federation. MM is an adviser for the Centre for Family Medicine Development Practice-Based Research Network. The other authors report no conflicts of interest.

Patient consent for publication

Not required

Ethics approval

This study was approved by the Institutional Review Board of the Jikei University School of Medicine (Study number: 27-277[8162]).

Provenance and peer review

Not commissioned; externally peer reviewed.

Data availability statement

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6 Because of the nature of this study, participants did not agree that their data could be shared publicly,
7 so supporting data are not available.
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APPENDIX 1

Primary care themes covered in the Family Medicine Brush-up Program

I. Typical health problems in primary care

| | | |
|----------------------|------------------------|-------------------------|
| Child – old age care | Palliative care | Women’s health |
| Rehabilitation | Mental health problems | Vaccination |
| Chinese medicine | Common emergencies | Musculoskeletal problem |
| Surgery | Ophthalmology | Otorhinolaryngology |

II. The principles of family medicine

| | | |
|-----------------------------------|------------------------|--------------------------------|
| Patient-centered clinical method | Family-oriented care | |
| Biopsychosocial model | Interprofessional work | |
| Prevention and health promotion | Ethics and law | Patient-clinician relationship |
| Healthcare context and continuity | Behavior modification | |
| Complexity and uncertainty | Reflective learning | |

III. Interpersonal and communication skills

| | |
|--------------------------|------------------------------------|
| Medical interview | Laboratory tests in the clinic |
| Clinical problem solving | Evidence-based medicine |
| Professionalism | Minorities and socially vulnerable |
| Facility management | Practice guidelines |

APPENDIX 2

Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

| No | Item | Guide questions/description |
|--|-------------------------|---|
| Domain 1: Research team and reflexivity | | |
| Personal Characteristics | | |
| 1. | Interviewer/facilitator | Which author/s conducted the interview or focus group? Yasuki Fujinuma conducted the focus group interview. Masayasu Seki and Tatsuhiro Joki assisted. Page 7. Masayasu Seki, MD, PhD Yasuki Fujinuma, MD Masato Matsushima, MD, PhD, MPH Tatsuhiro Joki, MD, PhD Hideo Okonogi, MD, PhD Yasuhiko Miura, MD, PhD |
| 2. | Credentials | What were the researchers' credentials? <i>E.g., PhD, MD</i> Jun Hiramoto, MD, PhD Iwao Ohno, MD, PhD. Page 1. |

| No | Item | Guide questions/description | |
|----|--|---|---|
| 3. | Occupation | What was their occupation at the time of the study? | All researchers were primary care physician. Page 1. |
| 4. | Gender | Was the researcher male or female? | All researchers were male. Page 1. |
| 5. | Experience and training | What experience or training did the researcher have? | We conducted this research using the same analysis as for a previous study. Page 4. |
| | Relationship with participants | | |
| 6. | Relationship established | Was a relationship established prior to study commencement? | Participants were interviewed after taking the Family Medicine Brush-up Program for two years. Interviewers facilitated the program. Page 4, 5. |
| 7. | Participant knowledge of the interviewer | What did the participants know about the researcher? e.g., | The participants received an explanation of the taped focus group interview process and gave their consent to participate. Page 5, 6, 7. |

| No | Item | Guide questions/description | |
|-------------------------------|---------------------------------------|---|---|
| | | <i>personal goals, reasons for doing the research</i> | |
| 8. | Interviewer characteristics | What characteristics were reported about the interviewer/facilitator? e.g., <i>Bias, assumptions, reasons and interests in the research topic</i> | The main interviewer (Yasuki Fuchinuma) was practicing primary care and was engaged in research and education activities in family medicine. Page 7. |
| Domain 2: study design | | | |
| Theoretical framework | | | |
| 9. | Methodological orientation and theory | What methodological orientation was stated to underpin the study? e.g., <i>grounded theory, discourse analysis, ethnography,</i> | We analyzed the interview records with the Steps for Coding and Theorization (SCAT) method which is a grounded theory-based thematic analysis approach. This method is suitable for the analysis of relatively small samples. The SCAT method improves reflexivity by looking back each |

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| No | Item | Guide questions/description | |
|-----|-----------------------|--|--|
| | | <i>phenomenology, content analysis</i> | steps, and can be expected to improve the possibility of falsifiability by clarifying the analysis process. Page 7, 8. |
| | Participant selection | | |
| 10. | Sampling | How were participants selected? <i>e.g., purposive, convenience, consecutive, snowball</i> | Participants were all those who had completed the two-year program. Page 5, 6. |
| 11. | Method of approach | How were participants approached? <i>e.g., face-to-face, telephone, mail, email</i> | Face-to-face. Page 6, 7. |
| 12. | Sample size | How many participants were in the study? | 8 participants. Page 5, 6. |
| 13. | Non-participation | How many people refused to participate or dropped out? Reasons? | None. Page 5, 6. |

| No | Item | Guide questions/description | |
|-----------------|------------------------------|---|---|
| Setting | | | |
| 14. | Setting of data collection | Where was the data collected? <i>e.g., home, clinic, workplace</i> | The participants were interviewed in a quiet room undisturbed by daily activities. Page 7. |
| 15. | Presence of non-participants | Was anyone else present besides the participants and researchers? | No. Page 6, 7. |
| 16. | Description of sample | What are the important characteristics of the sample? <i>e.g., demographic data, date</i> | Eight participants completed the Family Medicine Brush-up Program targeting physicians who had not undertaken specialist training in family medicine and had qualified at least 10 years previously. Page 5, 6. |
| Data collection | | | |
| 17. | Interview guide | Were questions, prompts, guides provided by the authors? Was it pilot tested? | The interview was conducted using the guiding questions and was not pilot tested. Page 6, 7. |

| No | Item | Guide questions/description | |
|-----|------------------------|--|---|
| 18. | Repeat interviews | Were repeat interviews carried out? If yes, how many? | A single focus group interview was conducted. Page 5, 6. |
| 19. | Audio/visual recording | Did the research use audio or visual recording to collect the data? | The interview was audio-recorded using a digital recorder. Page 5, 6. |
| 20. | Field notes | Were field notes made during and/or after the interview or focus group? | Yes. Page 6, 7. |
| 21. | Duration | What was the duration of the interviews or focus group? | 72 minutes. Page 7. |
| 22. | Data saturation | Was data saturation discussed? | Saturation was defined as the point with no new comments from the participants. Page 7. |
| 23. | Transcripts returned | Were transcripts returned to participants for comment and/or correction? | No. Page 7. |

| No | Item | Guide questions/description | |
|--|--------------------------------|---|---|
| Domain 3: analysis and findings | | | |
| Data analysis | | | |
| 24. | Number of data coders | How many data coders coded the data? | Two. Page 7. |
| 25. | Description of the coding tree | Did authors provide a description of the coding tree? | Yes (see results). Page 7, 8. |
| 26. | Derivation of themes | Were themes identified in advance or derived from the data? | Themes were derived from the data. Page 7, 8. |
| 27. | Software | What software, if applicable, was used to manage the data? | Not applicable. Page 7. |
| 28. | Participant checking | Did participants provide feedback on the findings? | No. Page 7. |

| No | Item | Guide questions/description | |
|-----------|------------------------------|--|--|
| Reporting | | | |
| 29. | Quotations presented | Were participant quotations presented to illustrate the themes/ findings? Was each quotation identified? e.g., <i>participant number</i> | Yes, quotations are presented and identified. Page 8, 9. |
| 30. | Data and findings consistent | Was there consistency between the data presented and the findings? | Yes. Page 8, 9, 10, 11. |
| 31. | Clarity of major themes | Were major themes clearly presented in the findings? | Yes. Page 8, 9. |
| 32. | Clarity of minor themes | Is there a description of diverse cases or discussion of minor themes? | Yes. Page 8, 9, 10, 11. |

APPENDIX 2

Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

| No | Item | Guide questions/description |
|--------------------------------------|-------------------------|---|
| Domain 1: | | |
| Research team and reflexivity | | |
| Personal Characteristics | | |
| 1. | Interviewer/facilitator | Which author/s conducted the interview or focus group? Yasuki Fujinuma conducted the focus group interview. Masayasu Seki and Tatsuhiro Joki assisted. Page 7. Masayasu Seki, MD, PhD Yasuki Fujinuma, MD Masato Matsushima, MD, PhD, MPH Tatsuhiro Joki, MD, PhD Hideo Okonogi, MD, PhD Yasuhiko Miura, MD, PhD |
| 2. | Credentials | What were the researchers' credentials? <i>E.g., PhD, MD</i> Jun Hiramoto, MD, PhD Iwao Ohno, MD, PhD. Page 1. |

| No | Item | Guide questions/description | |
|----|--|---|---|
| 3. | Occupation | What was their occupation at the time of the study? | All researchers were primary care physician. Page 1. |
| 4. | Gender | Was the researcher male or female? | All researchers were male. Page 1. |
| 5. | Experience and training | What experience or training did the researcher have? | We conducted this research using the same analysis as for a previous study. Page 4. |
| | Relationship with participants | | |
| 6. | Relationship established | Was a relationship established prior to study commencement? | Participants were interviewed after taking the Family Medicine Brush-up Program for two years. Interviewers facilitated the program. Page 4, 5. |
| 7. | Participant knowledge of the interviewer | What did the participants know about the researcher? e.g., | The participants received an explanation of the taped focus group interview process and gave their consent to participate. Page 5, 6, 7. |

| No | Item | Guide questions/description | |
|-------------------------------|---------------------------------------|---|---|
| | | <i>personal goals, reasons for doing the research</i> | |
| 8. | Interviewer characteristics | What characteristics were reported about the interviewer/facilitator? e.g., <i>Bias, assumptions, reasons and interests in the research topic</i> | The main interviewer (Yasuki Fuchinuma) was practicing primary care and was engaged in research and education activities in family medicine. Page 7. |
| Domain 2: study design | | | |
| Theoretical framework | | | |
| 9. | Methodological orientation and theory | What methodological orientation was stated to underpin the study? e.g., <i>grounded theory, discourse analysis, ethnography,</i> | We analyzed the interview records with the Steps for Coding and Theorization (SCAT) method which is a grounded theory-based thematic analysis approach. This method is suitable for the analysis of relatively small samples. The SCAT method improves reflexivity by looking back each |

| No | Item | Guide questions/description | |
|-----|-----------------------|--|--|
| | | <i>phenomenology, content analysis</i> | steps, and can be expected to improve the possibility of falsifiability by clarifying the analysis process. Page 7, 8. |
| | Participant selection | | |
| 10. | Sampling | How were participants selected? <i>e.g., purposive, convenience, consecutive, snowball</i> | Participants were all those who had completed the two-year program. Page 5, 6. |
| 11. | Method of approach | How were participants approached? <i>e.g., face-to-face, telephone, mail, email</i> | Face-to-face. Page 6, 7. |
| 12. | Sample size | How many participants were in the study? | 8 participants. Page 5, 6. |
| 13. | Non-participation | How many people refused to participate or dropped out? Reasons? | None. Page 5, 6. |

| No | Item | Guide questions/description | |
|-----------------|------------------------------|---|---|
| Setting | | | |
| 14. | Setting of data collection | Where was the data collected? <i>e.g., home, clinic, workplace</i> | The participants were interviewed in a quiet room undisturbed by daily activities. Page 7. |
| 15. | Presence of non-participants | Was anyone else present besides the participants and researchers? | No. Page 6, 7. |
| 16. | Description of sample | What are the important characteristics of the sample? <i>e.g., demographic data, date</i> | Eight participants completed the Family Medicine Brush-up Program targeting physicians who had not undertaken specialist training in family medicine and had qualified at least 10 years previously. Page 5, 6. |
| Data collection | | | |
| 17. | Interview guide | Were questions, prompts, guides provided by the authors? Was it pilot tested? | The interview was conducted using the guiding questions and was not pilot tested. Page 6, 7. |

| No | Item | Guide questions/description | |
|-----|------------------------|--|---|
| 18. | Repeat interviews | Were repeat interviews carried out? If yes, how many? | A single focus group interview was conducted. Page 5, 6. |
| 19. | Audio/visual recording | Did the research use audio or visual recording to collect the data? | The interview was audio-recorded using a digital recorder. Page 5, 6. |
| 20. | Field notes | Were field notes made during and/or after the interview or focus group? | Yes. Page 6, 7. |
| 21. | Duration | What was the duration of the interviews or focus group? | 72 minutes. Page 7. |
| 22. | Data saturation | Was data saturation discussed? | Saturation was defined as the point with no new comments from the participants. Page 7. |
| 23. | Transcripts returned | Were transcripts returned to participants for comment and/or correction? | No. Page 7. |

| No | Item | Guide questions/description | |
|--|--------------------------------|---|---|
| Domain 3: analysis and findings | | | |
| Data analysis | | | |
| 24. | Number of data coders | How many data coders coded the data? | Two. Page 7. |
| 25. | Description of the coding tree | Did authors provide a description of the coding tree? | Yes (see results). Page 7, 8. |
| 26. | Derivation of themes | Were themes identified in advance or derived from the data? | Themes were derived from the data. Page 7, 8. |
| 27. | Software | What software, if applicable, was used to manage the data? | Not applicable. Page 7. |
| 28. | Participant checking | Did participants provide feedback on the findings? | No. Page 7. |

| No | Item | Guide questions/description | |
|-----------|------------------------------|--|--|
| Reporting | | | |
| 29. | Quotations presented | Were participant quotations presented to illustrate the themes/ findings? Was each quotation identified? e.g., <i>participant number</i> | Yes, quotations are presented and identified. Page 8, 9. |
| 30. | Data and findings consistent | Was there consistency between the data presented and the findings? | Yes. Page 8, 9, 10, 11. |
| 31. | Clarity of major themes | Were major themes clearly presented in the findings? | Yes. Page 8, 9. |
| 32. | Clarity of minor themes | Is there a description of diverse cases or discussion of minor themes? | Yes. Page 8, 9, 10, 11. |

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Use of a 2-year continuing professional development program to change Japanese physicians' attitudes to learning primary care: a qualitative study

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| | |

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6 Use of a 2-year continuing professional development program to change Japanese physicians' attitudes
7 to learning primary care: a qualitative study
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9

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ABSTRACT

Objective

To evaluate changes in the learning attitudes of primary care physicians.

Design

Qualitative study through one focus group interview with the program's participants. Analysis of the focus group content using the Steps for Coding and Theorization (SCAT) method.

Setting

Japan.

Participants

Eight primary care physicians who completed a 2-year continuing professional development (CPD) program using a problem-based learning (PBL) approach, focused on acquiring the skills needed to practice as primary care physicians in the community.

Results

Participants described positive changes in their attitudes and behaviors as a result of the training program. These changes were grouped into three main themes: "changes in learning methods regarding medical practice," "encounters with diverse perspectives and values, and confidence gained from those encounters," and "showing one's attitude towards learning and its influence on others." The experienced practitioners participating in this study reported that the program helped them apply their skills more broadly; for example, searching the literature for psychosocial aspects of practice and engaging more comfortably with diverse perspectives. They reported the positive impact of their learning on their co-workers.

Conclusion

A 2-year CPD program using PBL can influence primary care physicians' attitudes and learning-related behaviors. Further research is needed to determine which specific aspects of the program are the most effective and whether the changes in attitudes and behaviors described affect patient care.

KEYWORDS: primary care, learning attitudes, qualitative, continuing professional development (CPD), problem-based learning.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- This study examined changes in learning attitudes (Kirkpatrick model level 3) among primary care physicians and the impact of the changes on other staff (Kirkpatrick level 4) following a 2-year CPD program.
- This study had a small sample size and was a single focus group interview conducted in 2018.
- It is unclear whether changes in learning attitudes among participants have led to improved quality of patient care.
- Bias may have occurred because of the fact that the program facilitator was the main interviewer.

INTRODUCTION

Medical education continues from undergraduate education to continuing professional development (CPD), with doctors working in various roles as practitioners, researchers, and teachers [1]. CPD responds not only to the development of the doctors' personal professional development, but also to the needs of patients, their families, and their community [2]. Family medicine and primary care are disciplines that provide long-term care centered on people of all ages and situations [3]. It is comprehensive, continuing from pre-natal care to palliative care [3]. No training program – regardless of its duration or content – can provide the postgraduate medical trainee with all competencies needed for primary care [3]. Primary care physicians need to commit to lifelong learning with a deliberate CPD plan to practice with an expert level of clinical skills [4].

General practitioners (GPs) in Japan may become family practitioners or hospitalists [5]. Approximately one-third of physicians in Japan are in charge of primary care at their own private clinic after 5–10 years of specialist practice training at university hospitals or city general hospitals [6]. Many physicians do not have public primary care training but independently undertake learning and training in this area. Unlike physicians in many other countries, they do not need to participate in a specific CPD program on primary care to maintain licensure [7]. The Japan Primary Care Association, established in 2010, is responsible for board certification of senior residents who complete their training program [5, 8]. The Japanese Medical Specialty Board (distinct from the Japan Primary Care Association) was newly established in 2017 to manage the certification of GPs in Japan [5]. Board-certified GPs were recognized as a new specialist category under a board certification senior resident training program that began in 2018 [8, 9]. Although an education program for senior residents is now in place, educational support for veteran primary care physicians, whose training was focused on specific organ systems, is inadequate. Therefore, we consider that the CPD of primary care physicians in Japan should be supported.

In April 2016, we started a 2-year Family Medicine Brush-up Program, which is an interactive CPD program for primary care physicians with a problem-based learning (PBL) approach. The program aimed to enable participants to discuss and learn about issues encountered in primary care by studying scenarios based on themes such as those found in Appendix 1 [10]. Through the program, we aimed to develop the ability to identify problems in the practice of medicine and to continue learning to solve them. The PBL approach allows learners to actively participate in group activities and helps learners develop into reflective practitioners [11]. The field of primary care is fraught with complex problems and uncertainties that make it difficult to arrive at a single correct management pathway [12]. We believe that primary care physicians who grow through repeated reflection have a strong affinity with lifelong learning, and for this reason we have adopted the PBL approach for this program. The PBL approach we used encompassed working in groups to discuss relevant, real problems. We conducted a qualitative study to clarify participants' training needs and

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2
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5
6 inform the program content [10]. Three categories of participant statements were established: “no
7
8 standard re-education program for primary care physicians to respond to changes in the clinical and
9
10 practice setting,” “problems with undergraduate and postgraduate medical education in primary care,”
11
12 and “content of primary care CPD” [10]. . After the 2-year program that started in 2016 was completed,
13
14 we considered evaluating the program to see how the participants had changed. We felt that the
15
16 completion of the 2-year program by a number of participants was a good milestone to study the impact
17
18 of the program on participants’ attitudes toward learning primary care.

19
20 The Kirkpatrick model is used to evaluate educational programs, including CPD programs
21
22 such as our Family Medicine Brush-up Program [1, 13]. The model focuses on the outcomes of the
23
24 program, not just learner satisfaction [14]. The Kirkpatrick model was proposed in the 1950s, and a
25
26 modified model (The New World Kirkpatrick model) was introduced in the 2000s [13]. The model
27
28 consists of four levels [1, 11]. Level 1 is reaction and satisfaction: Do learners respond favorably to
29
30 the program? Level 2 is learning measures: Do learners acquire the intended knowledge? Level 3 is
31
32 behavioral change: Do learners apply what they learned? Level 4 is results and impact: Do the expected
33
34 outcomes occur? [1, 13, 14]. The evaluation of how the participants’ learning changed is equivalent
35
36 to level 3 in this model. Related to this evaluation, a review by Samuel et al. reported outcomes that
37
38 affected health care practitioners’ behavioral changes [15]. In this review, changes in prescribing
39
40 patterns and modification of test ordering behavior are discussed in terms of level 3 outcomes [15].
41
42 Most of the findings reported at level 4 of the Kirkpatrick model were not statistically significant [15].
43
44 The review found that reports were limited, and it was difficult to assess patient outcomes equivalent
45
46 to level 4 from the CPD [15].

47
48 Online learning, e-learning, and computer-aided learning are reported as effective modalities
49
50 for CPD to achieve the learning objectives, and interventions such as lectures, interactive sessions,
51
52 audits, and feedback were also used [15]. In terms of the educational approach used in CPD, Al-Azri
53
54 et al. and Dowling et al. reported that a PBL approach can improve physicians’ performance and
55
56 patient care [16, 17]. A variety of modalities and interventions have been used for CPD [15].
57
58 Traditional face-to-face lectures are preferred by many participants, and there are no set
59
60 recommendations for CPD modalities and interventions [15]. It is also unclear whether participation
in our program yields the same changes in learners as those reported in previous studies. We therefore
needed to assess the perceived changes in learners after participating in our program and to discuss
whether those changes were comparable with similar changes reported in previous studies.

We surveyed participants in our program to examine the changes they experienced in their
attitudes to learning corresponding to Kirkpatrick level 3, and the impact of the changes on other staff
present in the workplace, corresponding to Kirkpatrick level 4. It is helpful to use an interview survey
and portfolio to evaluate the behavioral change corresponding to level 3 of this model [1, 13]. To elicit

detailed insights from individual participants, we chose to conduct a qualitative study based on interviews with participants, aiming to clarify how our program changed their attitudes to learning. We then used the interview with participants to investigate the impact of participants' changes on their immediate colleagues, corresponding to Kirkpatrick level 4.

METHODS

Study design and participants

On completion of the program (January 2018), we conducted a single focus group interview with program participants to investigate the changes that had occurred during the program. Interviews are considered effective for assessing changes in behavior corresponding to Kirkpatrick level 3 [1]. Interviews were also conducted with participants to investigate the impact on their immediate colleagues, which corresponds to Kirkpatrick level 4.

Eight participants completed the Family Medicine Brush-up Program targeting physicians who had not undertaken specialist training in family medicine and had qualified at least 10 years previously. The interview was conducted at the end of the program with the eight physicians (A–H, Table 1). This study was approved by the Institutional Review Board of the Jikei University School of Medicine (Study number: 27-277[8162]). All participants provided written informed consent to participate in this study. The results were presented following the COREQ guidelines for reporting qualitative studies [18] (Appendix 2).

Table 1. Attributes of participants

| | Age | Sex | Setting | Medical specialty |
|---|-----|-----|-----------------------|--|
| A | 50s | M | Private clinic | Cardiology |
| B | 40s | M | Private clinic | Emergency medicine |
| C | 30s | M | City general hospital | Rheumatology and connective tissue disease |
| D | 30s | F | City general hospital | Internal medicine |
| E | 30s | F | Private clinic | General medicine and primary care |
| F | 40s | F | University hospital | General medicine and primary care |

G 40s M City general Internal medicine
hospital

H 40s F Private clinic Anesthesiology

Data collection

The participants received an explanation of how the interview would be recorded and conducted, and consented to be interviewed. The focus group interview was conducted with the guiding questions: 1) “What kind of changes do you have in your awareness and behavior after taking this program?”; and 2) “Do you notice any change in the behavior or attitude of staff at your workplace?”

The participants were interviewed in a quiet room undisturbed by daily activities, using a digital recorder. Three authors (MS, YF, and TJ), all primary care physicians, managed the interviews. In this study, we considered it important to use and analyze the interactions generated by group discussions, and adopted the focus group interview method. Focus group interviews are also suitable for investigating attitudes and experiences [19, 20]. This method is reported to encourage people to talk about difficult content and voice critical opinions [19, 20]. Interviewers need to establish a positive rapport quickly during in-depth interviews [19]. In response to the interviewer’s questions, participants verbalize their own experiences. That verbalization builds on the interactions and social constructions created between the interviewer and the participant [21]. Based on this constructivism recognition, we considered that the authors, who ran the program and facilitated the participants, should act as interviewers, rather than having a third party involved. We felt that this would better promote group dynamics and elicit discussions among the participants [21]. Therefore, the authors acted as interviewers for the focus group interviews. YF had the most experience with interviewing and was therefore the main interviewer, with MS and TJ assisting. These three authors had also managed the program and facilitated the participants’ learning over the past 2 years.

The interview time was set at 60 minutes. When one participant responded to a question, several others typically added their opinions. YF asked all the participants questions using the guide questions in chronological order and encouraged participants with relatively few responses to provide additional opinions. In actuality, the interview took 72 minutes. At that point, the interviewer decided that theoretical saturation had been achieved without any further opinions from the participants.

Data analysis

We analyzed the interview records with the Steps for Coding and Theorization (SCAT) method, which is a grounded theory-based thematic analysis approach. SCAT is an analytical method

that adds codes in a four-step process, from raw interview data to themes (Table 2) [22-24]. We used this method when conducting a previous study on the needs of participants for the program [10]. SCAT is suitable for the analysis of relatively small samples, such as those used in the previous study, and it was considered appropriate to use SCAT for this study with a similarly small sample [22, 24]. The SCAT method improves reflexivity by looking back at each step, and can be expected to improve the possibility of falsifiability by clarifying the analysis process [22-24]. Therefore, the SCAT method was selected as the analysis method of this study. Using the tape transcript, two authors (MS and TJ) independently coded the text for SCAT steps 1 to 3 [22, 24]. The two authors conferred on conflicting opinions about the content of the code until they reached a joint consensus. Three authors (MS, TJ, and HO) independently conducted the coding for SCAT step 4 [22, 24]. The three authors again conferred and agreed on common themes and constructs about the content of the code.

Table 2. Four steps following the SCAT (Steps for Coding and Theorization) method

| | Analysis procedure | Examples |
|--------|---|---|
| Step 0 | Raw interview data | "I was able to learn systematically, not only biomedical issues but also psychosocial ones, by finding learning topics in scenarios, searching for literature, and considering it logically." |
| Step 1 | Notable words in step 0 | "learn systematically," "biomedical issues," "psychosocial ones," "searching for literature," "consider logically" |
| Step 2 | Words that are not in the data to paraphrase step 1 | Principles of family medicine, critical thinking |
| Step 3 | Words to explain step 2 | Experience of being able to apply evidence-based learning methods that were applicable to biological problems to psychosocial problems |

Step 4 Themes and constructs Changes in learning methods regarding medical practice that emerge from step 3

Patient and public involvement

There was no patient or public involvement in the design or implementation of this study.

RESULTS

Although our program took place over 2 years with nine participants enrolled, one participant dropped out after only 1 year because of changes in the participant's medical practice hours. Eight persons completed this program, and all agreed to participate in the interview. The participants' interview records were organized into three categories: "changes in learning regarding medical practice," "encounters with diverse perspectives and values, and confidence gained from those encounters," and "showing one's attitude towards learning and its influence on others" (Table 3). This section presents excerpts from focus group interviews on these categories.

Table 3. Themes and constructs about changes in behaviors

| Themes and constructs | Phrases |
|--|--|
| I: Changes in learning regarding medical practice | I-i: Search for material and literature, I-ii: psychosocial problems |
| II: Encounters with diverse perspectives and values, and confidence gained from those encounters | II-i: Confidence, no judgment attitude for another's opinion, II-ii: tolerance of diversity, II-iii: no standard re-education program, II-iv: loneliness about own practice |
| III: Showing one's attitude towards learning and its influence on others | III-i: Active transformation of colleagues' learning motivation |

I: Changes in learning regarding medical practice

This theme was subdivided into "search for material and literature (I-i)" and "psychosocial

1
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6 problems (I-ii)". The participants talked about how they moved from investigating biomedical
7 problems in their daily practice to investigating problems involving biomedical and psychosocial
8 factors.
9

10 I-i: Search for material and literature

11 As primary care physicians, the participants are solving clinical problems related to individual
12 patient consultations. They had few opportunities to reflect on their practice, such as the evidence
13 behind their treatment choices.
14

15
16
17 "I had never given much thought to my routine practice before, but the program made me dig deeper
18 again into questions such as what guidelines said and what kind of literature there was." (B)

19
20
21 Secondary materials were often used to search for evidence to support daily practice and to resolve
22 clinical problems. A change in participants' learning occurred in their search for primary materials
23 and raw data, such as statistical data about their learning tasks.
24

25
26 "Now I search not only for secondary materials but also primary materials." (C, D)

27
28 Searching for primary materials was a shift in attitude toward generating opinions based on the
29 participants' own ideas, to present their findings to other participants for discussion.
30

31
32 "All of us in the program gave presentations and had discussions based on statistics we looked up for
33 ourselves." (G)

34
35 I-ii: Psychosocial problems

36
37 Participants were experienced in searching mainly secondary materials about biomedical problems.
38 However, they had limited experience in searching material for information about psychosocial
39 problems. Participants' learning attitude toward problem solving for various clinical problems
40 changed.
41
42

43
44 "I was able to learn systematically, not only biomedical issues but also psychosocial ones, by finding
45 learning topics in scenarios, searching for literature, and considering it logically." (A)

46 47 48 49 **II: Encounters with diverse perspectives and values, and confidence gained from those** 50 **encounters**

51
52 This theme was subdivided into "confidence, non-judgmental attitude about other's opinions
53 (II-i)", "tolerance of diversity (II-ii)", "no standard re-education program (II-iii)" and "loneliness
54 about own practice (II-iv)". Participants who were inexperienced in primary care and operated in
55 isolation at their workplaces described how they had changed after attending the program.
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58 Ii-i: Confidence, non-judgmental attitude about other's opinions
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6 When presenting their ideas to others, participants were concerned that they would be judged on
7 whether they were correct or incorrect in their presentations. However, the non-judgmental
8 atmosphere supported participants' learning.
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11 "I felt like I would be judged for my presentation, but there was no critical atmosphere around
12 presentations at all. It was an environment where I could research my learning topic freely and get
13 feedback from everyone." (D)
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15 II-ii: Tolerance of diversity

16 The non-judgmental attitude was based on an attitude of respecting individual values and tolerating
17 diversity. These attitudes also encouraged participants to use primary materials and express their own
18 ideas.
19

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21 "I recognized that it's not really about whether someone is right or wrong, but that maybe there can
22 be all kinds of physicians." (E)
23

24 II-iii: No standard re-education program

25 One of the reasons participants lacked confidence in their own thinking and were afraid of being
26 judged was that they had not received standard retraining in primary care. They gained knowledge and
27 skills in primary care by attending the program, but also rediscovered the joy of learning through
28 encounters with diverse values.
29

30
31 "I dove right into practicing family medicine without training in it. I had no confidence in myself, and
32 I worried about what I should do and how I should study. The first thing that changed in me through
33 participating in this program was meeting all kinds of physicians and encountering many ways of
34 living. The program reminded me of the truth of how enjoyable it is to learn, even though my daily
35 work as a physician is overwhelming, to think hard about my next own learning topic and compare it
36 with what I actually see in my own patients." (H)
37

38 II-iv: Loneliness about own practice

39 Another reason for the lack of confidence and fear of judgment was the loneliness that participants
40 felt in their daily practice. They were generally administrators in their own health care organizations
41 and had no colleagues to talk to about various issues such as patient care, staff management and their
42 own concerns. Encountering diverse values helped to alleviate this loneliness.
43

44
45 "In the clinic, in my position as the manager, even when I get lonely or worry about my relationships
46 with my staff, I have no one to turn to for advice where my clinic is located. The only choice I ever
47 had was to sort things out in my own head. However, by going to a place far away from my clinic and
48 opening up to the people I met there, I learned that I'm not the only one who feels lonely." (H)
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6 Participants felt less lonely, and dealing with diversity allowed them to open up. As a result, the
7 participants realized the depth of their learning.
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9 "I have the impression that the level of learning varies quite a bit depending on how much someone
10 opens themselves up." (C)
11
12

13 14 15 **III: Showing one's attitude towards learning and its influence on others**

16 This theme had only one subtheme, "active transformation of colleagues' learning
17 motivation (III-i)". Participants saw their own learning change, gained confidence, and also shared
18 their learning with their colleagues. Their own development led others to change too.
19

20 21 **III-i: Active transformation of colleagues' learning motivation**

22 Even without setting up a formalized learning session, showing a learning attitude is linked to the
23 learning motivation of other colleagues.
24

25
26 "My staff told me that seeing me hard at work researching issues between examinations showed them
27 that it's possible to learn even when you're busy. They said that when they saw how I studied, it made
28 them want to work harder too." (H)
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30

31 Showing colleagues the learning content increases their motivation to learn.

32
33 "I now make it a point to tell all of my staff everything I learned about in this program. I make sure to
34 jot down what I learned and put it up in the meeting room." (A)
35
36

37 Based on the needs of the medical facility to which participants belong and the needs of their
38 colleagues, the sharing of their learning content also led to changes in patient care.
39

40
41 "For instance, I have the staff at my clinic actually write out genograms based on what I learn from
42 my patients. I think it's given my staff the ability to look at things from the perspective of the families
43 and lifestyles of our patients." (A)
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47 48 **DISCUSSION**

49 The first behavioral change that emerged in the participants' statements was a change in
50 learning (Theme I). One participant stated that their literature searches and logical reasoning had
51 changed regarding not only biological issues, but also psychosocial issues. Psychosocial problem-
52 solving is a core competence in family medicine and primary care [25]. The participants in our
53 program have a great deal of practical experience as specialists of different organs and are well-versed
54 in literature searches and logical reasoning for biological issues. In addition to this capacity, our results
55 suggested that completing our program may help participants acquire literature search and logical
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6 reasoning capacities for psychosocial issues.

7 The second behavioral change that emerged was related to encounters with diverse
8 perspectives and values and the confidence gained from those encounters (Theme II). As previous
9 studies have found, the absence of re-education programs often leads to learning in a solitary
10 environment [6, 26]. In Japan, many private physicians engaged in primary care have solo practices
11 [27]. By providing participants with an arena for learning, our program may have encouraged positive
12 changes in the participants' attitudes. Providing an arena for learning and forming a learning
13 community may be important, regardless of learning style. Further study is necessary to determine
14 whether confidence, a specific change in the participants' attitudes, results from the PBL approach.

15
16 Participants spoke favorably about our program being held away from the locations where
17 they practice. However, for physicians in rural areas, traveling to such programs is often considered
18 an obstacle to participation [17]. Holding programs online facilitates participation from remote areas.
19 In comparisons of online and on-site education, results are mixed [28]. One participant in the present
20 study stated that it is difficult to consult with other medical professionals in her own community about
21 issues encountered with patients. For learning about content highly relevant to the participants'
22 practices, providing a learning community away from the areas where they practice may foster better
23 learning. However, given the current COVID-19 pandemic, hosting the program online would reduce
24 the risk of infection. Additionally, health care utilization in Japan has changed. Aoki et al. highlighted
25 the need to strengthen primary care functions such as support for populations with social isolation and
26 multimorbidity [29]. Further research should consider changing the program to an online format and
27 modifying the primary care learning topics to be covered.

28
29 One participant in our study noted that discussions regarding the results of learning topics
30 and participants' practices and values did not lead to a judgmental atmosphere. A positive atmosphere
31 in classes and groups is considered to bring about cooperative learning, while positive discussions and
32 a learner culture are thought to diversify learning, encourage flexible thinking, and increase creativity
33 [30]. In East Asia, the learning style in medical education is based on Confucian culture [31]. The
34 communication style is expressed as "cultural reticence" [32] – a tendency to not actively express what
35 you know or feel [32]. Relevant to the comment that the level of learning may change depending on
36 the degree to which someone opens themselves up, the facilitator of learners' presentations and
37 discussions may need skills to provide the learners with a safe discussion atmosphere in which the
38 learners' presentations are not judged as right or wrong and which promotes self-disclosure. Currently,
39 no formal training exists for such facilitators. Going forward, training to help facilitators promote
40 discussion should be conducted while the program is administered.

41
42 The last behavioral change was the influence on others (Theme III). A present study suggests
43 that program participants can promote a positive attitude towards learning in their workplace staff and
44 others around them by demonstrating their own positive attitude towards learning and sharing what
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6 they have learned [33]. In East Asia, where Confucian influences are strong, students respect teachers,
7 learn from them, and imitate their attitudes [31]. Such a cultural background may also improve the
8 learning attitude of the workplace staff. However, it is unclear whether staff actually put their learning
9 into practice in patient care. Further examination of the effects of learning programs will require
10 surveys of the participants' staff and confirmation of changes in patient care.

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12
13 In this interview, we explored the changes among staff at the participants' health care
14 organizations, corresponding to Kirkpatrick level 4. However, it would be helpful to survey these staff
15 to determine if the outcomes identified in the interviews actually occurred.

16
17
18 The Kirkpatrick model was used to evaluate this program [14]. This model is useful because
19 of its clarity in focusing on program outcomes and its clear description of outcomes beyond simple
20 learner satisfaction [14]. However, this model on its own does not provide educators with a complete
21 evaluation of their educational programs [14, 34]. The model has been criticized on the grounds that
22 it does not include intervening variables, such as motivation and learner's entry level, and the
23 relationship between program elements and context [14, 35, 36]. In this interview, a participant
24 commented on the importance of a non-judgmental atmosphere. It is necessary to investigate the
25 intervening variables that have affected prior learning, and then conduct interviews with the
26 intervening variables in mind regarding changes in behavior in the study group.

27
28
29 In terms of the three changes in attitude, we will consider whether attending this program
30 was an effective learning exercise for the participants. The FAIR principles (Feedback, Activity,
31 Individualization, and Relevance) are known to be associated with effective learning [37]. The points
32 of Activity and Individualization were achieved by the use of small groups and a learning strategy in
33 which the learner selects the learning theme using the PBL approach. These points are evident from
34 both the observed change in attitude toward the learning group shown in Theme II and the change in
35 learning shown in Theme I as a result of the learning environment. In addition, the point of Relevance
36 is also satisfied by using a scenario that assumes the site of primary care. This was evident from the
37 fact that the program became a place to learn about problems faced in clinical practice, as described
38 in Theme II. Under the conditions of a solo medical practice and learning environment, and with self-
39 judgment of the correctness of learning tasks, appropriate feedback cannot be obtained from
40 facilitators and other participants. The interview results on Theme II suggest that participating with
41 confidence among participants with a diverse set of values in a non-judgmental environment provided
42 sufficient feedback. Additionally, providing appropriate feedback is one of the competencies required
43 as an educator [38]. Acting as a facilitator is one of the twelve roles of the educator, and feedback is
44 included in this role. The third attitude change in Theme III applies to participants being viewed as
45 role models. Studying in this program may also enhance participants' ability to support other learners
46 as a faculty member. By observing how participants behave as facilitators or role models in clinical
47 and learning settings, it may be possible to assess level 4 stages of the Kirkpatrick model for this
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6 program. This aspect could be a subject for future research. The Kirkpatrick model was used to
7 evaluate this program, but we aimed for an evaluation that went beyond the satisfaction of taking the
8 course. For this reason, the evaluation was set at level 3 instead of 1 or 2. However, we did not evaluate
9 the level 4 stage, which extends to how the program affected patients. Measuring outcomes in terms
10 of patient health and medical economy may be a future research topic for the CPD program. This
11 would require a survey of individual patients' illnesses and health conditions, as well as a survey of
12 management conditions. The outcomes should also investigate what changes have occurred in the staff
13 of the medical institutions to which the participants belong, using the participants as role models.
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19 **Limitations**

20 The interview in the present study may not necessarily reflect all changes in the attitudes to
21 learning among the program participants. It would also have been helpful to include the views of the
22 participant who did not complete the program.
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25 This study is an analysis of a single focus group interview with all participants who
26 completed the program. Although the participants are experienced primary care physicians, they do
27 not all have the same level of medical competence and knowledge on the themes of health problems
28 that are addressed in primary care. In addition, the level of their medical skills and knowledge was not
29 verified beforehand. It is possible that changes in the learning attitude of each participant may have
30 been overestimated or underestimated. Future research will require multiple focus groups with larger
31 numbers of participants divided by their subspecialty.
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36 The interview was conducted by facilitators who had been involved with the program for its
37 2-year duration. Close involvement in the learning process may have enabled the facilitators to
38 encourage deeper discussion than an interviewer without such involvement. Conversely, the
39 involvement of the interviewers in the learning process may have influenced the discussion about the
40 effective outcomes of the program, as participants might not have wanted to offend the facilitators.
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45 **CONCLUSIONS**

46 This study confirmed that participation in our 2-year CPD program changed participants'
47 learning attitudes and education-related behavior. Our results suggest that support of CPD for primary
48 care physicians requires the preparation of a learning community based on diverse values and
49 perspectives, and the capacity for facilitation to foster the learning community.
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For peer review only

STATEMENTS

Contributors

MS conceived the study, contributed to the development of its design, received the JSPS KAKENHI grant, collected the data, and analyzed the qualitative data. YF conceived the study, contributed to the development of the design, and interviewed the participants. MM conceived the study, contributed to the design, and facilitated the focus group interview. TJ facilitated the focus group interview and analyzed the qualitative data. HO analyzed the qualitative data and contributed to the design. YM, IO, and JH conceived the study and contributed to the design. All authors contributed to the drafting of the manuscript, and read and approved the final manuscript.

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Competing interests

MM received lecture fees and lecture travel fees from the Centre for Family Medicine Development of the Japanese Health and Welfare Co-operative Federation. MM is an adviser for the Centre for Family Medicine Development Practice-Based Research Network. The other authors report no conflicts of interest.

Patient consent for publication

Not required

Ethics approval

This study was approved by the Institutional Review Board of the Jikei University School of Medicine (Study number: 27-277[8162]).

Provenance and peer review

Not commissioned; externally peer reviewed.

Data availability statement

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6 Because of the nature of this study, participants did not agree that their data could be shared publicly,
7 so supporting data are not available.
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APPENDIX 1

Primary care themes covered in the Family Medicine Brush-up Program

I. Typical health problems in primary care

| | | |
|----------------------|------------------------|-------------------------|
| Child – old age care | Palliative care | Women’s health |
| Rehabilitation | Mental health problems | Vaccination |
| Chinese medicine | Common emergencies | Musculoskeletal problem |
| Surgery | Ophthalmology | Otorhinolaryngology |

II. The principles of family medicine

| | | |
|-----------------------------------|------------------------|--------------------------------|
| Patient-centered clinical method | Family-oriented care | |
| Biopsychosocial model | Interprofessional work | |
| Prevention and health promotion | Ethics and law | Patient-clinician relationship |
| Healthcare context and continuity | Behavior modification | |
| Complexity and uncertainty | Reflective learning | |

III. Interpersonal and communication skills

| | |
|--------------------------|------------------------------------|
| Medical interview | Laboratory tests in the clinic |
| Clinical problem solving | Evidence-based medicine |
| Professionalism | Minorities and socially vulnerable |
| Facility management | Practice guidelines |

APPENDIX 2

Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

| No | Item | Guide questions/description |
|--|-------------------------|---|
| Domain 1: Research team and reflexivity | | |
| Personal Characteristics | | |
| 1. | Interviewer/facilitator | Which author/s conducted the interview or focus group? Yasuki Fujinuma conducted the focus group interview. Masayasu Seki and Tatsuhiro Joki assisted. Page 7. Masayasu Seki, MD, PhD Yasuki Fujinuma, MD Masato Matsushima, MD, PhD, MPH Tatsuhiro Joki, MD, PhD Hideo Okonogi, MD, PhD Yasuhiko Miura, MD, PhD |
| 2. | Credentials | What were the researchers' credentials? <i>E.g., PhD, MD</i> Jun Hiramoto, MD, PhD Iwao Ohno, MD, PhD. Page 1. |

| No | Item | Guide questions/description | |
|--------------------------------|--|---|---|
| 3. | Occupation | What was their occupation at the time of the study? | All researchers were primary care physician. Page 1. |
| 4. | Gender | Was the researcher male or female? | All researchers were male. Page 1. |
| 5. | Experience and training | What experience or training did the researcher have? | We conducted this research using the same analysis as for a previous study. Page 4. |
| Relationship with participants | | | |
| 6. | Relationship established | Was a relationship established prior to study commencement? | Participants were interviewed after taking the Family Medicine Brush-up Program for two years. Interviewers facilitated the program. Page 4, 5. |
| 7. | Participant knowledge of the interviewer | What did the participants know about the researcher? e.g., | The participants received an explanation of the taped focus group interview process and gave their consent to participate. Page 5, 6, 7. |

| No | Item | Guide questions/description | |
|-------------------------------|---------------------------------------|---|---|
| | | <i>personal goals, reasons for doing the research</i> | |
| 8. | Interviewer characteristics | What characteristics were reported about the interviewer/facilitator? e.g., <i>Bias, assumptions, reasons and interests in the research topic</i> | The main interviewer (Yasuki Fuchinuma) was practicing primary care and was engaged in research and education activities in family medicine. Page 7. |
| Domain 2: study design | | | |
| | Theoretical framework | | |
| 9. | Methodological orientation and theory | What methodological orientation was stated to underpin the study? e.g., <i>grounded theory, discourse analysis, ethnography,</i> | We analyzed the interview records with the Steps for Coding and Theorization (SCAT) method which is a grounded theory-based thematic analysis approach. This method is suitable for the analysis of relatively small samples. The SCAT method improves reflexivity by looking back each |

| No | Item | Guide questions/description | |
|-----------------------|--------------------|--|--|
| | | <i>phenomenology, content analysis</i> | steps, and can be expected to improve the possibility of falsifiability by clarifying the analysis process. Page 7, 8. |
| Participant selection | | | |
| 10. | Sampling | How were participants selected? <i>e.g., purposive, convenience, consecutive, snowball</i> | Participants were all those who had completed the two-year program. Page 5, 6. |
| 11. | Method of approach | How were participants approached? <i>e.g., face-to-face, telephone, mail, email</i> | Face-to-face. Page 6, 7. |
| 12. | Sample size | How many participants were in the study? | 8 participants. Page 5, 6. |
| 13. | Non-participation | How many people refused to participate or dropped out? Reasons? | None. Page 5, 6. |

| No | Item | Guide questions/description | |
|-----------------|------------------------------|---|---|
| Setting | | | |
| 14. | Setting of data collection | Where was the data collected? <i>e.g., home, clinic, workplace</i> | The participants were interviewed in a quiet room undisturbed by daily activities. Page 7. |
| 15. | Presence of non-participants | Was anyone else present besides the participants and researchers? | No. Page 6, 7. |
| 16. | Description of sample | What are the important characteristics of the sample? <i>e.g., demographic data, date</i> | Eight participants completed the Family Medicine Brush-up Program targeting physicians who had not undertaken specialist training in family medicine and had qualified at least 10 years previously. Page 5, 6. |
| Data collection | | | |
| 17. | Interview guide | Were questions, prompts, guides provided by the authors? Was it pilot tested? | The interview was conducted using the guiding questions and was not pilot tested. Page 6, 7. |

| No | Item | Guide questions/description | |
|-----|------------------------|--|---|
| 18. | Repeat interviews | Were repeat interviews carried out? If yes, how many? | A single focus group interview was conducted. Page 5, 6. |
| 19. | Audio/visual recording | Did the research use audio or visual recording to collect the data? | The interview was audio-recorded using a digital recorder. Page 5, 6. |
| 20. | Field notes | Were field notes made during and/or after the interview or focus group? | Yes. Page 6, 7. |
| 21. | Duration | What was the duration of the interviews or focus group? | 72 minutes. Page 7. |
| 22. | Data saturation | Was data saturation discussed? | Saturation was defined as the point with no new comments from the participants. Page 7. |
| 23. | Transcripts returned | Were transcripts returned to participants for comment and/or correction? | No. Page 7. |

| No | Item | Guide questions/description | |
|--|--------------------------------|---|---|
| Domain 3: analysis and findings | | | |
| Data analysis | | | |
| 24. | Number of data coders | How many data coders coded the data? | Two. Page 7. |
| 25. | Description of the coding tree | Did authors provide a description of the coding tree? | Yes (see results). Page 7, 8. |
| 26. | Derivation of themes | Were themes identified in advance or derived from the data? | Themes were derived from the data. Page 7, 8. |
| 27. | Software | What software, if applicable, was used to manage the data? | Not applicable. Page 7. |
| 28. | Participant checking | Did participants provide feedback on the findings? | No. Page 7. |

| No | Item | Guide questions/description | |
|-----------|------------------------------|--|--|
| Reporting | | | |
| 29. | Quotations presented | Were participant quotations presented to illustrate the themes/ findings? Was each quotation identified? e.g., <i>participant number</i> | Yes, quotations are presented and identified. Page 8, 9. |
| 30. | Data and findings consistent | Was there consistency between the data presented and the findings? | Yes. Page 8, 9, 10, 11. |
| 31. | Clarity of major themes | Were major themes clearly presented in the findings? | Yes. Page 8, 9. |
| 32. | Clarity of minor themes | Is there a description of diverse cases or discussion of minor themes? | Yes. Page 8, 9, 10, 11. |

APPENDIX 2

Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

| No | Item | Guide questions/description |
|--------------------------------------|-------------------------|---|
| Domain 1: | | |
| Research team and reflexivity | | |
| Personal Characteristics | | |
| 1. | Interviewer/facilitator | Which author/s conducted the interview or focus group? Yasuki Fujinuma conducted the focus group interview. Masayasu Seki and Tatsuhiro Joki assisted. Page 7. Masayasu Seki, MD, PhD Yasuki Fujinuma, MD Masato Matsushima, MD, PhD, MPH Tatsuhiro Joki, MD, PhD Hideo Okonogi, MD, PhD Yasuhiko Miura, MD, PhD |
| 2. | Credentials | What were the researchers' credentials? <i>E.g., PhD, MD</i> Jun Hiramoto, MD, PhD Iwao Ohno, MD, PhD. Page 1. |

| No | Item | Guide questions/description | |
|--------------------------------|--|---|---|
| 3. | Occupation | What was their occupation at the time of the study? | All researchers were primary care physician. Page 1. |
| 4. | Gender | Was the researcher male or female? | All researchers were male. Page 1. |
| 5. | Experience and training | What experience or training did the researcher have? | We conducted this research using the same analysis as for a previous study. Page 4. |
| Relationship with participants | | | |
| 6. | Relationship established | Was a relationship established prior to study commencement? | Participants were interviewed after taking the Family Medicine Brush-up Program for two years. Interviewers facilitated the program. Page 4, 5. |
| 7. | Participant knowledge of the interviewer | What did the participants know about the researcher? e.g., | The participants received an explanation of the taped focus group interview process and gave their consent to participate. Page 5, 6, 7. |

| No | Item | Guide questions/description | |
|-------------------------------|---------------------------------------|---|---|
| | | <i>personal goals, reasons for doing the research</i> | |
| 8. | Interviewer characteristics | What characteristics were reported about the interviewer/facilitator? e.g., <i>Bias, assumptions, reasons and interests in the research topic</i> | The main interviewer (Yasuki Fuchinuma) was practicing primary care and was engaged in research and education activities in family medicine. Page 7. |
| Domain 2: study design | | | |
| | Theoretical framework | | |
| 9. | Methodological orientation and theory | What methodological orientation was stated to underpin the study? e.g., <i>grounded theory, discourse analysis, ethnography,</i> | We analyzed the interview records with the Steps for Coding and Theorization (SCAT) method which is a grounded theory-based thematic analysis approach. This method is suitable for the analysis of relatively small samples. The SCAT method improves reflexivity by looking back each |

| No | Item | Guide questions/description | |
|-----------------------|--------------------|--|--|
| | | <i>phenomenology, content analysis</i> | steps, and can be expected to improve the possibility of falsifiability by clarifying the analysis process. Page 7, 8. |
| Participant selection | | | |
| 10. | Sampling | How were participants selected? <i>e.g., purposive, convenience, consecutive, snowball</i> | Participants were all those who had completed the two-year program. Page 5, 6. |
| 11. | Method of approach | How were participants approached? <i>e.g., face-to-face, telephone, mail, email</i> | Face-to-face. Page 6, 7. |
| 12. | Sample size | How many participants were in the study? | 8 participants. Page 5, 6. |
| 13. | Non-participation | How many people refused to participate or dropped out? Reasons? | None. Page 5, 6. |

| No | Item | Guide questions/description | |
|-----------------|------------------------------|---|---|
| Setting | | | |
| 14. | Setting of data collection | Where was the data collected? <i>e.g., home, clinic, workplace</i> | The participants were interviewed in a quiet room undisturbed by daily activities. Page 7. |
| 15. | Presence of non-participants | Was anyone else present besides the participants and researchers? | No. Page 6, 7. |
| 16. | Description of sample | What are the important characteristics of the sample? <i>e.g., demographic data, date</i> | Eight participants completed the Family Medicine Brush-up Program targeting physicians who had not undertaken specialist training in family medicine and had qualified at least 10 years previously. Page 5, 6. |
| Data collection | | | |
| 17. | Interview guide | Were questions, prompts, guides provided by the authors? Was it pilot tested? | The interview was conducted using the guiding questions and was not pilot tested. Page 6, 7. |

| No | Item | Guide questions/description | |
|-----|------------------------|--|---|
| 18. | Repeat interviews | Were repeat interviews carried out? If yes, how many? | A single focus group interview was conducted. Page 5, 6. |
| 19. | Audio/visual recording | Did the research use audio or visual recording to collect the data? | The interview was audio-recorded using a digital recorder. Page 5, 6. |
| 20. | Field notes | Were field notes made during and/or after the interview or focus group? | Yes. Page 6, 7. |
| 21. | Duration | What was the duration of the interviews or focus group? | 72 minutes. Page 7. |
| 22. | Data saturation | Was data saturation discussed? | Saturation was defined as the point with no new comments from the participants. Page 7. |
| 23. | Transcripts returned | Were transcripts returned to participants for comment and/or correction? | No. Page 7. |

| No | Item | Guide questions/description | |
|--|--------------------------------|---|---|
| Domain 3: analysis and findings | | | |
| Data analysis | | | |
| 24. | Number of data coders | How many data coders coded the data? | Two. Page 7. |
| 25. | Description of the coding tree | Did authors provide a description of the coding tree? | Yes (see results). Page 7, 8. |
| 26. | Derivation of themes | Were themes identified in advance or derived from the data? | Themes were derived from the data. Page 7, 8. |
| 27. | Software | What software, if applicable, was used to manage the data? | Not applicable. Page 7. |
| 28. | Participant checking | Did participants provide feedback on the findings? | No. Page 7. |

| No | Item | Guide questions/description | |
|-----------|------------------------------|--|--|
| Reporting | | | |
| 29. | Quotations presented | Were participant quotations presented to illustrate the themes/ findings? Was each quotation identified? e.g., <i>participant number</i> | Yes, quotations are presented and identified. Page 8, 9. |
| 30. | Data and findings consistent | Was there consistency between the data presented and the findings? | Yes. Page 8, 9, 10, 11. |
| 31. | Clarity of major themes | Were major themes clearly presented in the findings? | Yes. Page 8, 9. |
| 32. | Clarity of minor themes | Is there a description of diverse cases or discussion of minor themes? | Yes. Page 8, 9, 10, 11. |

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Use of a 2-year continuing professional development program to change Japanese physicians' attitudes to learning primary care: a qualitative study

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6 Use of a 2-year continuing professional development program to change Japanese physicians' attitudes
7 to learning primary care: a qualitative study
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ABSTRACT

Objective

To evaluate changes in the learning attitudes of primary care physicians.

Design

Qualitative study through one focus group interview with the program's participants. Analysis of the focus group content using the Steps for Coding and Theorization (SCAT) method.

Setting

Japan.

Participants

Eight primary care physicians who completed a 2-year continuing professional development (CPD) program using a problem-based learning (PBL) approach, focused on acquiring the skills needed to practice as primary care physicians in the community.

Results

Participants described positive changes in their attitudes and behaviors as a result of the training program. These changes were grouped into three main themes: "changes in learning methods regarding medical practice," "encounters with diverse perspectives and values, and confidence gained from those encounters," and "showing one's attitude towards learning and its influence on others." The experienced practitioners participating in this study reported that the program helped them apply their skills more broadly; for example, searching the literature for psychosocial aspects of practice and engaging more comfortably with diverse perspectives. They reported the positive impact of their learning on their co-workers.

Conclusion

A 2-year CPD program using PBL can influence primary care physicians' attitudes and learning-related behaviors. Further research is needed to determine which specific aspects of the program are the most effective and whether the changes in attitudes and behaviors described affect patient care.

KEYWORDS: primary care, learning attitudes, qualitative, continuing professional development (CPD), problem-based learning.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- This study examined changes in learning attitudes (Kirkpatrick model level 3) among primary care physicians and the impact of the changes on other staff (Kirkpatrick level 4) following a 2-year CPD program.
- This study had a small sample size and was a single focus group interview conducted in 2018.
- It is unclear whether changes in learning attitudes among participants have led to improved quality of patient care.
- Bias may have occurred because of the fact that the program facilitator was the main interviewer.

INTRODUCTION

Medical education continues from undergraduate education to continuing professional development (CPD), with doctors working in various roles as practitioners, researchers, and teachers [1]. CPD responds not only to the development of the doctors' personal professional development, but also to the needs of patients, their families, and their community [2]. Family medicine and primary care are disciplines that provide long-term care centered on people of all ages and situations [3]. It is comprehensive, continuing from pre-natal care to palliative care [3]. No training program – regardless of its duration or content – can provide the postgraduate medical trainee with all competencies needed for primary care [3]. Primary care physicians need to commit to lifelong learning with a deliberate CPD plan to practice with an expert level of clinical skills [4].

General practitioners (GPs) in Japan may become family practitioners or hospitalists [5]. Approximately one-third of physicians in Japan are in charge of primary care at their own private clinic after 5–10 years of specialist practice training at university hospitals or city general hospitals [6]. Many physicians do not have public primary care training but independently undertake learning and training in this area. Unlike physicians in many other countries, they do not need to participate in a specific CPD program on primary care to maintain licensure [7]. The Japan Primary Care Association, established in 2010, is responsible for board certification of senior residents who complete their training program [5, 8]. The Japanese Medical Specialty Board (distinct from the Japan Primary Care Association) was newly established in 2017 to manage the certification of GPs in Japan [5]. Board-certified GPs were recognized as a new specialist category under a board certification senior resident training program that began in 2018 [8, 9]. Although an education program for senior residents is now in place, educational support for veteran primary care physicians, whose training was focused on specific organ systems, is inadequate. Therefore, we consider that the CPD of primary care physicians in Japan should be supported.

In April 2016, we started a 2-year Family Medicine Brush-up Program, which is an interactive CPD program for primary care physicians with a problem-based learning (PBL) approach. The program aimed to enable participants to discuss and learn about issues encountered in primary care by studying scenarios based on themes such as those found in Appendix 1 [10]. Through the program, we aimed to develop the ability to identify problems in the practice of medicine and to continue learning to solve them. Al-Azri et al. and Dowling et al. reported that a PBL approach can improve physicians' performance and patient care [11, 12]. The PBL approach allows learners to actively participate in group activities and helps learners develop into reflective practitioners [13]. The field of primary care is fraught with complex problems and uncertainties that make it difficult to arrive at a single correct management pathway [14]. We believe that primary care physicians who grow through repeated reflection have a strong affinity with lifelong learning, and for this reason we have adopted the PBL approach for this program. The PBL approach we used encompassed working in

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6 groups to discuss relevant, real problems. We conducted a qualitative study to clarify participants'
7 training needs and inform the program content [10]. Three categories of participant statements were
8 established: "no standard re-education program for primary care physicians to respond to changes in
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10 the clinical and practice setting," "problems with undergraduate and postgraduate medical education
11 in primary care," and "content of primary care CPD" [10]. After the 2-year program that started in
12 2016 was completed, we considered evaluating the program to see how the participants had changed.
13 We felt that the completion of the 2-year program by a number of participants was a good milestone
14 to study the impact of the program on participants' attitudes toward learning primary care.
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19 The Kirkpatrick model is used to evaluate educational programs, including CPD programs
20 such as our Family Medicine Brush-up Program [1, 15]. The model focuses on the outcomes of the
21 program, not just learner satisfaction [16]. The Kirkpatrick model was proposed in the 1950s, and a
22 modified model (The New World Kirkpatrick model) was introduced in the 2000s [15]. The model
23 consists of four levels [1, 13]. Level 1 is reaction and satisfaction: Do learners respond favorably to
24 the program? Level 2 is learning measures: Do learners acquire the intended knowledge? Level 3 is
25 behavioral change: Do learners apply what they learned? Level 4 is results and impact: Do the expected
26 outcomes occur? [1, 15, 16].
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31 We surveyed participants in our program, which aimed to develop the the ability to identify
32 problems in the practice of medicine and to continue learning to solve them, to examine the changes
33 they experienced in their attitudes to learning corresponding to Kirkpatrick level 3, and the impact of
34 the changes on other staff present in the workplace, corresponding to Kirkpatrick level 4. It is helpful
35 to use an interview survey and portfolio to evaluate the behavioral change corresponding to level 3 of
36 this model [1, 15]. To elicit detailed insights from individual participants, we chose to conduct a
37 qualitative study based on interviews with participants, aiming to clarify how our program changed
38 their attitudes to learning. We then used the interview with participants to investigate the impact of
39 participants' changes on their immediate colleagues, corresponding to Kirkpatrick level 4.
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46 **METHODS**

47 **Study design and participants**

48 On completion of the program (January 2018), we conducted a single focus group interview
49 with program participants to investigate changes in behavior that had occurred during the program
50 corresponding to Kirkpatrick level 3 and to investigate impacts on their immediate colleagues
51 corresponding to Kirkpatrick level 4. Interviews are considered effective for assessing these changes
52 in behavior and their impacts [1].
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57 Eight participants completed the Family Medicine Brush-up Program targeting physicians
58 who had not undertaken specialist training in family medicine and had qualified at least 10 years
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previously. The interview was conducted at the end of the program with the eight physicians (A–H, Table 1). This study was approved by the Institutional Review Board of the Jikei University School of Medicine (Study number: 27-277[8162]). All participants provided written informed consent to participate in this study. The results were presented following the COREQ guidelines for reporting qualitative studies [17] (Appendix 2).

Table 1. Attributes of participants

| | Age | Sex | Setting | Medical specialty |
|---|-----|-----|-----------------------|--|
| A | 50s | M | Private clinic | Cardiology |
| B | 40s | M | Private clinic | Emergency medicine |
| C | 30s | M | City general hospital | Rheumatology and connective tissue disease |
| D | 30s | F | City general hospital | Internal medicine |
| E | 30s | F | Private clinic | General medicine and primary care |
| F | 40s | F | University hospital | General medicine and primary care |
| G | 40s | M | City general hospital | Internal medicine |
| H | 40s | F | Private clinic | Anesthesiology |

Data collection

The participants received an explanation of how the interview would be recorded and conducted, and consented to be interviewed. The focus group interview was conducted with the guiding questions: 1) “What kind of changes do you have in your awareness and behavior after taking this program?”; and 2) “Do you notice any change in the behavior or attitude of staff at your workplace?”

The participants were interviewed in a quiet room undisturbed by daily activities, using a digital recorder. Three authors (MS, YF, and TJ), all primary care physicians, managed the interviews.

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6 In this study, we considered it important to use and analyze the interactions generated by group
7 discussions, and adopted the focus group interview method. Focus group interviews are also suitable
8 for investigating attitudes and experiences [18, 19]. This method is reported to encourage people to
9 talk about difficult content and voice critical opinions [18, 19]. Interviewers need to establish a positive
10 rapport quickly during in-depth interviews [18]. In response to the interviewer's questions, participants
11 verbalize their own experiences. That verbalization builds on the interactions and social constructions
12 created between the interviewer and the participant [20]. Based on this constructivism recognition, we
13 considered that the authors, who ran the program and facilitated the participants, should act as
14 interviewers, rather than having a third party involved. We felt that this would better promote group
15 dynamics and elicit discussions among the participants [20]. Therefore, the authors acted as
16 interviewers for the focus group interviews. YF had the most experience with interviewing and was
17 therefore the main interviewer, with MS and TJ assisting. These three authors had also managed the
18 program and facilitated the participants' learning over the past 2 years.

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The interview time was set at 60 minutes. When one participant responded to a question,
several others typically added their opinions. YF asked all the participants questions using the guide
questions in chronological order and encouraged participants with relatively few responses to provide
additional opinions. In actuality, the interview took 72 minutes. At that point, the interviewer decided
that theoretical saturation had been achieved without any further opinions from the participants.

Data analysis

We analyzed the interview records with the Steps for Coding and Theorization (SCAT)
method, which is a grounded theory-based thematic analysis approach. SCAT is an analytical method
that adds codes in a four-step process, from raw interview data to themes (Table 2) [21-23]. We used
this method when conducting a previous study on the needs of participants for the program [10]. SCAT
is suitable for the analysis of relatively small samples, such as those used in the previous study, and it
was considered appropriate to use SCAT for this study with a similarly small sample [21, 23]. The
SCAT method improves reflexivity by looking back at each step, and can be expected to improve the
possibility of falsifiability by clarifying the analysis process [21-23]. Therefore, the SCAT method
was selected as the analysis method of this study. Using the tape transcript, two authors (MS and TJ)
independently coded the text for SCAT steps 1 to 3 [21, 23]. The two authors conferred on conflicting
opinions about the content of the code until they reached a joint consensus. Three authors (MS, TJ,
and HO) independently conducted the coding for SCAT step 4 [21, 23]. The three authors again
conferred and agreed on common themes and constructs about the content of the code.

Table 2. Four steps following the SCAT (Steps for Coding and Theorization) method

| | Analysis procedure | Examples |
|--------|---|---|
| Step 0 | Raw interview data | “I was able to learn systematically, not only biomedical issues but also psychosocial ones, by finding learning topics in scenarios, searching for literature, and considering it logically.” |
| Step 1 | Notable words in step 0 | “learn systematically,” “biomedical issues,” “psychosocial ones,” “searching for literature,” “consider logically” |
| Step 2 | Words that are not in the data to paraphrase step 1 | Principles of family medicine, critical thinking |
| Step 3 | Words to explain step 2 | Experience of being able to apply evidence-based learning methods that were applicable to biological problems to psychosocial problems |
| Step 4 | Themes and constructs that emerge from step 3 | Changes in learning methods regarding medical practice |

Patient and public involvement

There was no patient or public involvement in the design or implementation of this study.

RESULTS

Although our program took place over 2 years with nine participants enrolled, one participant dropped out after only 1 year because of changes in the participant’s medical practice hours. Eight persons completed this program, and all agreed to participate in the interview. The participants’ interview records were organized into three categories: “changes in learning regarding medical practice,” “encounters with diverse perspectives and values, and confidence gained from those encounters,” and “showing one’s attitude towards learning and its influence on others” (Table 3). This section presents excerpts from focus group interviews on these categories.

Table 3. Themes and constructs about changes in behaviors

| Themes and constructs | Phrases |
|--|--|
| I: Changes in learning regarding medical practice | I-i: Search for material and literature, I-ii: psychosocial problems |
| II: Encounters with diverse perspectives and values, and confidence gained from those encounters | II-i: Confidence, no judgment attitude for another's opinion, II-ii: tolerance of diversity, II-iii: no standard re-education program, II-iv: loneliness about own practice |
| III: Showing one's attitude towards learning and its influence on others | III-i: Active transformation of colleagues' learning motivation |

I: Changes in learning regarding medical practice

This theme was subdivided into “search for material and literature (I-i)” and “psychosocial problems (I-ii)”. The participants talked about how they moved from investigating biomedical problems in their daily practice to investigating problems involving biomedical and psychosocial factors.

I-i: Search for material and literature

As primary care physicians, the participants are solving clinical problems related to individual patient consultations. They had few opportunities to reflect on their practice, such as the evidence behind their treatment choices.

“I had never given much thought to my routine practice before, but the program made me dig deeper again into questions such as what guidelines said and what kind of literature there was.” (B)

Secondary materials were often used to search for evidence to support daily practice and to resolve clinical problems. A change in participants' learning occurred in their search for primary materials and raw data, such as statistical data about their learning tasks.

“Now I search not only for secondary materials but also primary materials.” (C, D)

Searching for primary materials was a shift in attitude toward generating opinions based on the participants' own ideas, to present their findings to other participants for discussion.

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“All of us in the program gave presentations and had discussions based on statistics we looked up for ourselves.” (G)

I-ii: Psychosocial problems

Participants were experienced in searching mainly secondary materials about biomedical problems. However, they had limited experience in searching material for information about psychosocial problems. Participants' learning attitude toward problem solving for various clinical problems changed.

“I was able to learn systematically, not only biomedical issues but also psychosocial ones, by finding learning topics in scenarios, searching for literature, and considering it logically.” (A)

II: Encounters with diverse perspectives and values, and confidence gained from those encounters

This theme was subdivided into “confidence, non-judgmental attitude about other's opinions (II-i)”, “tolerance of diversity (II-ii)”, “no standard re-education program (II-iii)” and “loneliness about own practice (II-iv)”. Participants who were inexperienced in primary care and operated in isolation at their workplaces described how they had changed after attending the program.

Ii-i: Confidence, non-judgmental attitude about other's opinions

When presenting their ideas to others, participants were concerned that they would be judged on whether they were correct or incorrect in their presentations. However, the non-judgmental atmosphere supported participants' learning.

“I felt like I would be judged for my presentation, but there was no critical atmosphere around presentations at all. It was an environment where I could research my learning topic freely and get feedback from everyone.” (D)

II-ii: Tolerance of diversity

The non-judgmental attitude was based on an attitude of respecting individual values and tolerating diversity. These attitudes also encouraged participants to use primary materials and express their own ideas.

“I recognized that it's not really about whether someone is right or wrong, but that maybe there can be all kinds of physicians.” (E)

II-iii: No standard re-education program

One of the reasons participants lacked confidence in their own thinking and were afraid of being judged was that they had not received standard retraining in primary care. They gained knowledge and

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6 skills in primary care by attending the program, but also rediscovered the joy of learning through
7 encounters with diverse values.
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10 "I dove right into practicing family medicine without training in it. I had no confidence in myself, and
11 I worried about what I should do and how I should study. The first thing that changed in me through
12 participating in this program was meeting all kinds of physicians and encountering many ways of
13 living. The program reminded me of the truth of how enjoyable it is to learn, even though my daily
14 work as a physician is overwhelming, to think hard about my next own learning topic and compare it
15 with what I actually see in my own patients." (H)
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19 II-iv: Loneliness about own practice

20 Another reason for the lack of confidence and fear of judgment was the loneliness that participants
21 felt in their daily practice. They were generally administrators in their own health care organizations
22 and had no colleagues to talk to about various issues such as patient care, staff management and their
23 own concerns. Encountering diverse values helped to alleviate this loneliness.
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27 "In the clinic, in my position as the manager, even when I get lonely or worry about my relationships
28 with my staff, I have no one to turn to for advice where my clinic is located. The only choice I ever
29 had was to sort things out in my own head. However, by going to a place far away from my clinic and
30 opening up to the people I met there, I learned that I'm not the only one who feels lonely." (H)
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34 Participants felt less lonely, and dealing with diversity allowed them to open up. As a result, the
35 participants realized the depth of their learning.
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38 "I have the impression that the level of learning varies quite a bit depending on how much someone
39 opens themselves up." (C)
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43 **III: Showing one's attitude towards learning and its influence on others**

44 This theme had only one subtheme, "active transformation of colleagues' learning
45 motivation (III-i)". Participants saw their own learning change, gained confidence, and also shared
46 their learning with their colleagues. Their own development led others to change too.
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49 III-i: Active transformation of colleagues' learning motivation

50 Even without setting up a formalized learning session, showing a learning attitude is linked to the
51 learning motivation of other colleagues.
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54 "My staff told me that seeing me hard at work researching issues between examinations showed them
55 that it's possible to learn even when you're busy. They said that when they saw how I studied, it made
56 them want to work harder too." (H)
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6 Showing colleagues the learning content increases their motivation to learn.

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8 "I now make it a point to tell all of my staff everything I learned about in this program. I make sure to
9
10 jot down what I learned and put it up in the meeting room." (A)

11 Based on the needs of the medical facility to which participants belong and the needs of their
12 colleagues, the sharing of their learning content also led to changes in patient care.

13
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15 "For instance, I have the staff at my clinic actually write out genograms based on what I learn from
16
17 my patients. I think it's given my staff the ability to look at things from the perspective of the families
18 and lifestyles of our patients." (A)
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22 **DISCUSSION**

23 The first behavioral change that emerged in the participants' statements was a change in
24 learning (Theme I). One participant stated that their literature searches and logical reasoning had
25 changed regarding not only biological issues, but also psychosocial issues. Psychosocial problem-
26 solving is a core competence in family medicine and primary care [24]. The participants in our
27 program have a great deal of practical experience as specialists of different organs and are well-versed
28 in literature searches and logical reasoning for biological issues. In addition to this capacity, our results
29 suggested that completing our program may help participants acquire literature search and logical
30 reasoning capacities for psychosocial issues.
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36 The second behavioral change that emerged was related to encounters with diverse
37 perspectives and values and the confidence gained from those encounters (Theme II). As previous
38 studies have found, the absence of re-education programs often leads to learning in a solitary
39 environment [6, 25]. In Japan, many private physicians engaged in primary care have solo practices
40 [26]. By providing participants with an arena for learning, our program may have encouraged positive
41 changes in the participants' attitudes. Providing an arena for learning and forming a learning
42 community may be important, regardless of learning style. Further study is necessary to determine
43 whether confidence, a specific change in the participants' attitudes, results from the PBL approach.
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48 Participants spoke favorably about our program being held away from the locations where
49 they practice. However, for physicians in rural areas, traveling to such programs is often considered
50 an obstacle to participation [12]. Holding programs online facilitates participation from remote areas.
51 In comparisons of online and on-site education, results are mixed [27]. One participant in the present
52 study stated that it is difficult to consult with other medical professionals in her own community about
53 issues encountered with patients. For learning about content highly relevant to the participants'
54 practices, providing a learning community away from the areas where they practice may foster better
55 learning. In relation to the CPD modalities, traditional face-to-face lectures are preferred by many
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6 participants [28]. However, given the current COVID-19 pandemic, hosting the program online would
7 reduce the risk of infection. Additionally, health care utilization in Japan has changed. Aoki et al.
8 highlighted the need to strengthen primary care functions such as support for populations with social
9 isolation and multimorbidity [29]. Further research should consider changing the program to an online
10 format and modifying the primary care learning topics to be covered.
11

12
13 One participant in our study noted that discussions regarding the results of learning topics
14 and participants' practices and values did not lead to a judgmental atmosphere. A positive atmosphere
15 in classes and groups is considered to bring about cooperative learning, while positive discussions and
16 a learner culture are thought to diversify learning, encourage flexible thinking, and increase creativity
17 [30]. In East Asia, the learning style in medical education is based on Confucian culture [31]. The
18 communication style is expressed as "cultural reticence" [32] – a tendency to not actively express what
19 you know or feel [32]. Relevant to the comment that the level of learning may change depending on
20 the degree to which someone opens themselves up, the facilitator of learners' presentations and
21 discussions may need skills to provide the learners with a safe discussion atmosphere in which the
22 learners' presentations are not judged as right or wrong and which promotes self-disclosure. Currently,
23 no formal training exists for such facilitators. Going forward, training to help facilitators promote
24 discussion should be conducted while the program is administered.
25

26
27 The last behavioral change was the influence on others (Theme III). A present study suggests
28 that program participants can promote a positive attitude towards learning in their workplace staff and
29 others around them by demonstrating their own positive attitude towards learning and sharing what
30 they have learned [33]. In East Asia, where Confucian influences are strong, students respect teachers,
31 learn from them, and imitate their attitudes [31]. Such a cultural background may also improve the
32 learning attitude of the workplace staff. Further examination of the effects of learning programs will
33 require surveys of the participants' staff and confirmation of changes in patient care.
34

35
36 The Kirkpatrick model was used to evaluate this program [16]. This model is useful because
37 of its clarity in focusing on program outcomes and its clear description of outcomes beyond simple
38 learner satisfaction [16]. However, this model on its own does not provide educators with a complete
39 evaluation of their educational programs [16, 34]. The model has been criticized on the grounds that
40 it does not include intervening variables, such as motivation and learner's entry level, and the
41 relationship between program elements and context [16, 35, 36]. In this interview, a participant
42 commented on the importance of a non-judgmental atmosphere. It is necessary to investigate the
43 intervening variables that have affected prior learning, and then conduct interviews with the
44 intervening variables in mind regarding changes in behavior in the study group.
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46
47 In terms of the three changes in attitude, we will consider whether attending this program
48 was an effective learning exercise for the participants. The FAIR principles (Feedback, Activity,
49 Individualization, and Relevance) are known to be associated with effective learning [37]. The points
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6 of Activity and Individualization were achieved by the use of small groups and a learning strategy in
7 which the learner selects the learning theme using the PBL approach. These points are evident from
8 both the observed change in attitude toward the learning group shown in Theme II and the change in
9 learning shown in Theme I as a result of the learning environment. In addition, the point of Relevance
10 is also satisfied by using a scenario that assumes the site of primary care. This was evident from the
11 fact that the program became a place to learn about problems faced in clinical practice, as described
12 in Theme II. Under the conditions of a solo medical practice and learning environment, and with self-
13 judgment of the correctness of learning tasks, appropriate feedback cannot be obtained from
14 facilitators and other participants. The interview results on Theme II suggest that participating with
15 confidence among participants with a diverse set of values in a non-judgmental environment provided
16 sufficient feedback. Additionally, providing appropriate feedback is one of the competencies required
17 as an educator [38]. Acting as a facilitator is one of the twelve roles of the educator, and feedback is
18 included in this role. The third attitude change in Theme III applies to participants being viewed as
19 role models. Studying in this program may also enhance participants' ability to support other learners
20 as a faculty member. By observing how participants behave as facilitators or role models in clinical
21 and learning settings, it may be possible to assess level 4 stages of the Kirkpatrick model for this
22 program. This aspect could be a subject for future research.

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31 The Kirkpatrick model was used to evaluate this program, but we aimed for an evaluation
32 that went beyond the satisfaction of taking the course. For this reason, the evaluation was set at level
33 3 and 4 instead of 1 or 2. We evaluated one aspect of level 4 of the Kirkpatrick model measured
34 through the impact the practitioner had on their colleagues. However, we did not evaluate another
35 aspect of the impact on patient outcomes. As Samuel et al. state in their review, the outcomes
36 corresponding to level 4 of the Kirkpatrick model from CPD programs are not supported by sufficient
37 evidence [28]. Measuring outcomes in terms of patient health and medical economy may be a future
38 research topic for the CPD program. This would require a survey of individual patients' illnesses and
39 health conditions, as well as a survey of management conditions. The outcomes should also investigate
40 what changes have occurred in the staff of the medical institutions to which the participants belong,
41 using the participants as role models.

42 43 44 45 46 47 48 49 **Limitations**

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51 The interview in the present study may not necessarily reflect all changes in the attitudes to
52 learning among the program participants. It would also have been helpful to include the views of the
53 participant who did not complete the program.

54
55 This study is an analysis of a single focus group interview with all participants who
56 completed the program. Although the participants are experienced primary care physicians, they do
57 not all have the same level of medical competence and knowledge on the themes of health problems
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6 that are addressed in primary care. In addition, the level of their medical skills and knowledge was not
7 verified beforehand. It is possible that changes in the learning attitude of each participant may have
8 been overestimated or underestimated. Future research will require multiple focus groups with larger
9 numbers of participants divided by their subspecialty.
10

11 The interview was conducted by facilitators who had been involved with the program for its
12 2-year duration. Close involvement in the learning process may have enabled the facilitators to
13 encourage deeper discussion than an interviewer without such involvement. Conversely, the
14 involvement of the interviewers in the learning process may have influenced the discussion about the
15 effective outcomes of the program, as participants might not have wanted to offend the facilitators.
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20 **CONCLUSIONS**

21 This study confirmed that participation in our 2-year CPD program changed participants'
22 learning attitudes and education-related behavior. Our results suggest that support of CPD for primary
23 care physicians requires the preparation of a learning community based on diverse values and
24 perspectives, and the capacity for facilitation to foster the learning community.
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29 **ACKNOWLEDGMENTS**

30 We thank Michelle Pascoe, PhD, from Edanz (<https://jp.edanz.com/ac>) for editing a draft of this
31 manuscript and helping to draft the abstract.
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For peer review only

STATEMENTS

Contributors

MS conceived the study, contributed to the development of its design, received the JSPS KAKENHI grant, collected the data, and analyzed the qualitative data. YF conceived the study, contributed to the development of the design, and interviewed the participants. MM conceived the study, contributed to the design, and facilitated the focus group interview. TJ facilitated the focus group interview and analyzed the qualitative data. HO analyzed the qualitative data and contributed to the design. YM, IO, and JH conceived the study and contributed to the design. All authors contributed to the drafting of the manuscript, and read and approved the final manuscript.

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Competing interests

MM received lecture fees and lecture travel fees from the Centre for Family Medicine Development of the Japanese Health and Welfare Co-operative Federation. MM is an adviser for the Centre for Family Medicine Development Practice-Based Research Network. The other authors report no conflicts of interest.

Patient consent for publication

Not required

Ethics approval

This study was approved by the Institutional Review Board of the Jikei University School of Medicine (Study number: 27-277[8162]).

Provenance and peer review

Not commissioned; externally peer reviewed.

Data availability statement

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6 Because of the nature of this study, participants did not agree that their data could be shared publicly,
7 so supporting data are not available.
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For peer review only

APPENDIX 1

Primary care themes covered in the Family Medicine Brush-up Program

I. Typical health problems in primary care

| | | |
|----------------------|------------------------|-------------------------|
| Child – old age care | Palliative care | Women’s health |
| Rehabilitation | Mental health problems | Vaccination |
| Chinese medicine | Common emergencies | Musculoskeletal problem |
| Surgery | Ophthalmology | Otorhinolaryngology |

II. The principles of family medicine

| | | |
|-----------------------------------|------------------------|--------------------------------|
| Patient-centered clinical method | Family-oriented care | |
| Biopsychosocial model | Interprofessional work | |
| Prevention and health promotion | Ethics and law | Patient-clinician relationship |
| Healthcare context and continuity | Behavior modification | |
| Complexity and uncertainty | Reflective learning | |

III. Interpersonal and communication skills

| | |
|--------------------------|------------------------------------|
| Medical interview | Laboratory tests in the clinic |
| Clinical problem solving | Evidence-based medicine |
| Professionalism | Minorities and socially vulnerable |
| Facility management | Practice guidelines |

APPENDIX 2

Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

| No | Item | Guide questions/description |
|--|-------------------------|---|
| Domain 1: Research team and reflexivity | | |
| Personal Characteristics | | |
| 1. | Interviewer/facilitator | Which author/s conducted the interview or focus group? Yasuki Fujinuma conducted the focus group interview. Masayasu Seki and Tatsuhiro Joki assisted. Page 7. Masayasu Seki, MD, PhD Yasuki Fujinuma, MD Masato Matsushima, MD, PhD, MPH Tatsuhiro Joki, MD, PhD Hideo Okonogi, MD, PhD Yasuhiko Miura, MD, PhD |
| 2. | Credentials | What were the researchers' credentials? <i>E.g., PhD, MD</i> Jun Hiramoto, MD, PhD Iwao Ohno, MD, PhD. Page 1. |

| No | Item | Guide questions/description | |
|--------------------------------|--|---|---|
| 3. | Occupation | What was their occupation at the time of the study? | All researchers were primary care physician. Page 1. |
| 4. | Gender | Was the researcher male or female? | All researchers were male. Page 1. |
| 5. | Experience and training | What experience or training did the researcher have? | We conducted this research using the same analysis as for a previous study. Page 4. |
| Relationship with participants | | | |
| 6. | Relationship established | Was a relationship established prior to study commencement? | Participants were interviewed after taking the Family Medicine Brush-up Program for two years. Interviewers facilitated the program. Page 4, 5. |
| 7. | Participant knowledge of the interviewer | What did the participants know about the researcher? e.g., | The participants received an explanation of the taped focus group interview process and gave their consent to participate. Page 5, 6, 7. |

| No | Item | Guide questions/description | |
|-------------------------------|---------------------------------------|---|---|
| | | <i>personal goals, reasons for doing the research</i> | |
| 8. | Interviewer characteristics | What characteristics were reported about the interviewer/facilitator? e.g., <i>Bias, assumptions, reasons and interests in the research topic</i> | The main interviewer (Yasuki Fuchinuma) was practicing primary care and was engaged in research and education activities in family medicine. Page 7. |
| Domain 2: study design | | | |
| | Theoretical framework | | |
| 9. | Methodological orientation and theory | What methodological orientation was stated to underpin the study? e.g., <i>grounded theory, discourse analysis, ethnography,</i> | We analyzed the interview records with the Steps for Coding and Theorization (SCAT) method which is a grounded theory-based thematic analysis approach. This method is suitable for the analysis of relatively small samples. The SCAT method improves reflexivity by looking back each |

| No | Item | Guide questions/description | |
|-----------------------|--------------------|--|--|
| | | <i>phenomenology, content analysis</i> | steps, and can be expected to improve the possibility of falsifiability by clarifying the analysis process. Page 7, 8. |
| Participant selection | | | |
| 10. | Sampling | How were participants selected? <i>e.g., purposive, convenience, consecutive, snowball</i> | Participants were all those who had completed the two-year program. Page 5, 6. |
| 11. | Method of approach | How were participants approached? <i>e.g., face-to-face, telephone, mail, email</i> | Face-to-face. Page 6, 7. |
| 12. | Sample size | How many participants were in the study? | 8 participants. Page 5, 6. |
| 13. | Non-participation | How many people refused to participate or dropped out? Reasons? | None. Page 5, 6. |

| No | Item | Guide questions/description | |
|-----------------|------------------------------|---|---|
| Setting | | | |
| 14. | Setting of data collection | Where was the data collected? <i>e.g., home, clinic, workplace</i> | The participants were interviewed in a quiet room undisturbed by daily activities. Page 7. |
| 15. | Presence of non-participants | Was anyone else present besides the participants and researchers? | No. Page 6, 7. |
| 16. | Description of sample | What are the important characteristics of the sample? <i>e.g., demographic data, date</i> | Eight participants completed the Family Medicine Brush-up Program targeting physicians who had not undertaken specialist training in family medicine and had qualified at least 10 years previously. Page 5, 6. |
| Data collection | | | |
| 17. | Interview guide | Were questions, prompts, guides provided by the authors? Was it pilot tested? | The interview was conducted using the guiding questions and was not pilot tested. Page 6, 7. |

| No | Item | Guide questions/description | |
|-----|------------------------|--|---|
| 18. | Repeat interviews | Were repeat interviews carried out? If yes, how many? | A single focus group interview was conducted. Page 5, 6. |
| 19. | Audio/visual recording | Did the research use audio or visual recording to collect the data? | The interview was audio-recorded using a digital recorder. Page 5, 6. |
| 20. | Field notes | Were field notes made during and/or after the interview or focus group? | Yes. Page 6, 7. |
| 21. | Duration | What was the duration of the interviews or focus group? | 72 minutes. Page 7. |
| 22. | Data saturation | Was data saturation discussed? | Saturation was defined as the point with no new comments from the participants. Page 7. |
| 23. | Transcripts returned | Were transcripts returned to participants for comment and/or correction? | No. Page 7. |

| No | Item | Guide questions/description | |
|--|--------------------------------|---|---|
| Domain 3: analysis and findings | | | |
| Data analysis | | | |
| 24. | Number of data coders | How many data coders coded the data? | Two. Page 7. |
| 25. | Description of the coding tree | Did authors provide a description of the coding tree? | Yes (see results). Page 7, 8. |
| 26. | Derivation of themes | Were themes identified in advance or derived from the data? | Themes were derived from the data. Page 7, 8. |
| 27. | Software | What software, if applicable, was used to manage the data? | Not applicable. Page 7. |
| 28. | Participant checking | Did participants provide feedback on the findings? | No. Page 7. |

| No | Item | Guide questions/description | |
|-----------|------------------------------|--|--|
| Reporting | | | |
| 29. | Quotations presented | Were participant quotations presented to illustrate the themes/ findings? Was each quotation identified? e.g., <i>participant number</i> | Yes, quotations are presented and identified. Page 8, 9. |
| 30. | Data and findings consistent | Was there consistency between the data presented and the findings? | Yes. Page 8, 9, 10, 11. |
| 31. | Clarity of major themes | Were major themes clearly presented in the findings? | Yes. Page 8, 9. |
| 32. | Clarity of minor themes | Is there a description of diverse cases or discussion of minor themes? | Yes. Page 8, 9, 10, 11. |

APPENDIX 2

Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

| No | Item | Guide questions/description |
|--------------------------------------|-------------------------|---|
| Domain 1: | | |
| Research team and reflexivity | | |
| Personal Characteristics | | |
| 1. | Interviewer/facilitator | Which author/s conducted the interview or focus group? Yasuki Fujinuma conducted the focus group interview. Masayasu Seki and Tatsuhiro Joki assisted. Page 7. Masayasu Seki, MD, PhD Yasuki Fujinuma, MD Masato Matsushima, MD, PhD, MPH Tatsuhiro Joki, MD, PhD Hideo Okonogi, MD, PhD Yasuhiko Miura, MD, PhD |
| 2. | Credentials | What were the researchers' credentials? <i>E.g., PhD, MD</i> Jun Hiramoto, MD, PhD Iwao Ohno, MD, PhD. Page 1. |

| No | Item | Guide questions/description | |
|--------------------------------|--|---|---|
| 3. | Occupation | What was their occupation at the time of the study? | All researchers were primary care physician. Page 1. |
| 4. | Gender | Was the researcher male or female? | All researchers were male. Page 1. |
| 5. | Experience and training | What experience or training did the researcher have? | We conducted this research using the same analysis as for a previous study. Page 4. |
| Relationship with participants | | | |
| 6. | Relationship established | Was a relationship established prior to study commencement? | Participants were interviewed after taking the Family Medicine Brush-up Program for two years. Interviewers facilitated the program. Page 4, 5. |
| 7. | Participant knowledge of the interviewer | What did the participants know about the researcher? e.g., | The participants received an explanation of the taped focus group interview process and gave their consent to participate. Page 5, 6, 7. |

| No | Item | Guide questions/description | |
|-------------------------------|---------------------------------------|---|---|
| | | <i>personal goals, reasons for doing the research</i> | |
| 8. | Interviewer characteristics | What characteristics were reported about the interviewer/facilitator? e.g., <i>Bias, assumptions, reasons and interests in the research topic</i> | The main interviewer (Yasuki Fuchinuma) was practicing primary care and was engaged in research and education activities in family medicine. Page 7. |
| Domain 2: study design | | | |
| Theoretical framework | | | |
| 9. | Methodological orientation and theory | What methodological orientation was stated to underpin the study? e.g., <i>grounded theory, discourse analysis, ethnography,</i> | We analyzed the interview records with the Steps for Coding and Theorization (SCAT) method which is a grounded theory-based thematic analysis approach. This method is suitable for the analysis of relatively small samples. The SCAT method improves reflexivity by looking back each |

| No | Item | Guide questions/description | |
|-----------------------|--------------------|--|--|
| | | <i>phenomenology, content analysis</i> | steps, and can be expected to improve the possibility of falsifiability by clarifying the analysis process. Page 7, 8. |
| Participant selection | | | |
| 10. | Sampling | How were participants selected? <i>e.g., purposive, convenience, consecutive, snowball</i> | Participants were all those who had completed the two-year program. Page 5, 6. |
| 11. | Method of approach | How were participants approached? <i>e.g., face-to-face, telephone, mail, email</i> | Face-to-face. Page 6, 7. |
| 12. | Sample size | How many participants were in the study? | 8 participants. Page 5, 6. |
| 13. | Non-participation | How many people refused to participate or dropped out? Reasons? | None. Page 5, 6. |

| No | Item | Guide questions/description | |
|-----------------|------------------------------|---|---|
| Setting | | | |
| 14. | Setting of data collection | Where was the data collected? <i>e.g., home, clinic, workplace</i> | The participants were interviewed in a quiet room undisturbed by daily activities. Page 7. |
| 15. | Presence of non-participants | Was anyone else present besides the participants and researchers? | No. Page 6, 7. |
| 16. | Description of sample | What are the important characteristics of the sample? <i>e.g., demographic data, date</i> | Eight participants completed the Family Medicine Brush-up Program targeting physicians who had not undertaken specialist training in family medicine and had qualified at least 10 years previously. Page 5, 6. |
| Data collection | | | |
| 17. | Interview guide | Were questions, prompts, guides provided by the authors? Was it pilot tested? | The interview was conducted using the guiding questions and was not pilot tested. Page 6, 7. |

| No | Item | Guide questions/description | |
|-----|------------------------|--|---|
| 18. | Repeat interviews | Were repeat interviews carried out? If yes, how many? | A single focus group interview was conducted. Page 5, 6. |
| 19. | Audio/visual recording | Did the research use audio or visual recording to collect the data? | The interview was audio-recorded using a digital recorder. Page 5, 6. |
| 20. | Field notes | Were field notes made during and/or after the interview or focus group? | Yes. Page 6, 7. |
| 21. | Duration | What was the duration of the interviews or focus group? | 72 minutes. Page 7. |
| 22. | Data saturation | Was data saturation discussed? | Saturation was defined as the point with no new comments from the participants. Page 7. |
| 23. | Transcripts returned | Were transcripts returned to participants for comment and/or correction? | No. Page 7. |

| No | Item | Guide questions/description | |
|--|--------------------------------|---|---|
| Domain 3: analysis and findings | | | |
| Data analysis | | | |
| 24. | Number of data coders | How many data coders coded the data? | Two. Page 7. |
| 25. | Description of the coding tree | Did authors provide a description of the coding tree? | Yes (see results). Page 7, 8. |
| 26. | Derivation of themes | Were themes identified in advance or derived from the data? | Themes were derived from the data. Page 7, 8. |
| 27. | Software | What software, if applicable, was used to manage the data? | Not applicable. Page 7. |
| 28. | Participant checking | Did participants provide feedback on the findings? | No. Page 7. |

| No | Item | Guide questions/description | |
|-----------|------------------------------|--|--|
| Reporting | | | |
| 29. | Quotations presented | Were participant quotations presented to illustrate the themes/ findings? Was each quotation identified? e.g., <i>participant number</i> | Yes, quotations are presented and identified. Page 8, 9. |
| 30. | Data and findings consistent | Was there consistency between the data presented and the findings? | Yes. Page 8, 9, 10, 11. |
| 31. | Clarity of major themes | Were major themes clearly presented in the findings? | Yes. Page 8, 9. |
| 32. | Clarity of minor themes | Is there a description of diverse cases or discussion of minor themes? | Yes. Page 8, 9, 10, 11. |

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Use of a 2-year continuing professional development program to change Japanese physicians' attitudes to learning primary care: a qualitative study

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6 Use of a 2-year continuing professional development program to change Japanese physicians' attitudes
7 to learning primary care: a qualitative study
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ABSTRACT

Objective

To evaluate changes in the learning attitudes of primary care physicians.

Design

Qualitative study through one focus group interview with the program's participants. Analysis of the focus group content using the Steps for Coding and Theorization (SCAT) method.

Setting

Japan.

Participants

Eight primary care physicians who completed a 2-year continuing professional development (CPD) program using a problem-based learning (PBL) approach, focused on acquiring the skills needed to practice as primary care physicians in the community.

Results

Participants described positive changes in their attitudes and behaviors as a result of the training program. These changes were grouped into three main themes: "changes in learning methods regarding medical practice," "encounters with diverse perspectives and values, and confidence gained from those encounters," and "showing one's attitude towards learning and its influence on others." The experienced practitioners participating in this study reported that the program helped them apply their skills more broadly; for example, searching the literature for psychosocial aspects of practice and engaging more comfortably with diverse perspectives. They reported the positive impact of their learning on their co-workers.

Conclusion

A 2-year CPD program using PBL can influence primary care physicians' attitudes and learning-related behaviors. Further research is needed to determine which specific aspects of the program are the most effective and whether the changes in attitudes and behaviors described affect patient care.

KEYWORDS: primary care, learning attitudes, qualitative, continuing professional development (CPD), problem-based learning.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- This study examined changes in learning attitudes (Kirkpatrick model level 3) among primary care physicians and the impact of the changes on other staff (Kirkpatrick level 4) following a 2-year CPD program.
- This study had a small sample size and was a single focus group interview conducted in 2018.
- It is unclear whether changes in learning attitudes among participants have led to improved quality of patient care.
- Bias may have occurred because of the fact that the program facilitator was the main interviewer.

INTRODUCTION

Medical education continues from undergraduate education to continuing professional development (CPD), with doctors working in various roles as practitioners, researchers, and teachers [1]. CPD responds not only to the development of the doctors' personal professional development, but also to the needs of patients, their families, and their community [2]. Family medicine and primary care are disciplines that provide long-term care centered on people of all ages and situations [3]. It is comprehensive, continuing from pre-natal care to palliative care [3]. No training program – regardless of its duration or content – can provide the postgraduate medical trainee with all competencies needed for primary care [3]. Primary care physicians need to commit to lifelong learning with a deliberate CPD plan to practice with an expert level of clinical skills [4].

General practitioners (GPs) in Japan may become family practitioners or hospitalists [5]. Approximately one-third of physicians in Japan are in charge of primary care at their own private clinic after 5–10 years of specialist practice training at university hospitals or city general hospitals [6]. Many physicians do not have public primary care training but independently undertake learning and training in this area. Unlike physicians in many other countries, they do not need to participate in a specific CPD program on primary care to maintain licensure [7]. The Japan Primary Care Association, established in 2010, is responsible for board certification of senior residents who complete their training program [5, 8]. The Japanese Medical Specialty Board (distinct from the Japan Primary Care Association) was newly established in 2017 to manage the certification of GPs in Japan [5]. Board-certified GPs were recognized as a new specialist category under a board certification senior resident training program that began in 2018 [8, 9]. Although an education program for senior residents is now in place, educational support for veteran primary care physicians, whose training was focused on specific organ systems, is inadequate. Therefore, we consider that the CPD of primary care physicians in Japan should be supported.

In April 2016, we started a 2-year Family Medicine Brush-up Program, which is an interactive CPD program for primary care physicians with a problem-based learning (PBL) approach. The program aimed to enable participants to discuss and learn about issues encountered in primary care by studying scenarios based on themes such as those found in Appendix 1 [10]. We conducted a qualitative study to clarify participants' training needs and inform the program content [10]. Three categories of participant statements were established: “no standard re-education program for primary care physicians to respond to changes in the clinical and practice setting,” “problems with undergraduate and postgraduate medical education in primary care,” and “content of primary care CPD” [10]. Through the program, we aimed to develop the ability to identify problems in the practice of medicine and to continue learning to solve them. Al-Azri et al. and Dowling et al. reported that a PBL approach can improve physicians' performance and patient care [11, 12]. The PBL approach allows learners to actively participate in group activities and helps learners develop into reflective

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6 practitioners [13]. The field of primary care is fraught with complex problems and uncertainties that
7 make it difficult to arrive at a single correct management pathway [14]. We believe that primary care
8 physicians who grow through repeated reflection have a strong affinity with lifelong learning, and for
9 this reason we have adopted the PBL approach for this program. The PBL approach we used
10 encompassed working in groups to discuss relevant, real problems. After the 2-year program that
11 started in 2016 was completed, we considered evaluating the program to see how the participants had
12 changed. We felt that the completion of the 2-year program by a number of participants was a good
13 milestone to study the impact of the program on participants' attitudes toward learning primary care.
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17 The Kirkpatrick model is used to evaluate educational programs, including CPD programs
18 such as our Family Medicine Brush-up Program [1, 15]. The model focuses on the outcomes of the
19 program, not just learner satisfaction [16]. The Kirkpatrick model was proposed in the 1950s, and a
20 modified model (The New World Kirkpatrick model) was introduced in the 2000s [15]. The model
21 consists of four levels [1, 13]. Level 1 is reaction and satisfaction: Do learners respond favorably to
22 the program? Level 2 is learning measures: Do learners acquire the intended knowledge? Level 3 is
23 behavioral change: Do learners apply what they learned? Level 4 is results and impact: Do the expected
24 outcomes occur? [1, 15, 16].
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28 In this study, we aimed to examine the changes that our program participants experienced
29 in their attitudes towards learning (corresponding to Kirkpatrick level 3) and the impact those changes
30 had on other staff present in the workplace (corresponding to Kirkpatrick level 4). To elicit detailed
31 insights from individual participants, we chose to conduct a qualitative study based on focus group
32 interviews with the program participants to explore those two dimensions of change and understand
33 how our program contributed to those changes.
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40 **METHODS**

41 **Study design and participants**

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43 On completion of the program (January 2018), we conducted a single focus group interview
44 with program participants to investigate changes in behavior that had occurred during the program
45 corresponding to Kirkpatrick level 3 and to investigate impacts on their immediate colleagues
46 corresponding to Kirkpatrick level 4. Interviews are considered effective for assessing these changes
47 in behavior and their impacts [1].
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51 Eight participants completed the Family Medicine Brush-up Program targeting physicians
52 who had not undertaken specialist training in family medicine and had qualified at least 10 years
53 previously. The interview was conducted at the end of the program with the eight physicians (A–H,
54 Table 1). This study was approved by the Institutional Review Board of the Jikei University School
55 of Medicine (Study number: 27-277[8162]). All participants provided written informed consent to
56 participate in this study. The results were presented following the COREQ guidelines for reporting
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qualitative studies [17] (Appendix 2).

Table 1. Attributes of participants

| | Age | Sex | Setting | Medical specialty |
|---|-----|-----|-----------------------|--|
| A | 50s | M | Private clinic | Cardiology |
| B | 40s | M | Private clinic | Emergency medicine |
| C | 30s | M | City general hospital | Rheumatology and connective tissue disease |
| D | 30s | F | City general hospital | Internal medicine |
| E | 30s | F | Private clinic | General medicine and primary care |
| F | 40s | F | University hospital | General medicine and primary care |
| G | 40s | M | City general hospital | Internal medicine |
| H | 40s | F | Private clinic | Anesthesiology |

Data collection

The participants received an explanation of how the interview would be recorded and conducted, and consented to be interviewed. The focus group interview was conducted with the guiding questions: 1) “What kind of changes do you have in your awareness and behavior after taking this program?”; and 2) “Do you notice any change in the behavior or attitude of staff at your workplace?”

The participants were interviewed in a quiet room undisturbed by daily activities, using a digital recorder. Three authors (MS, YF, and TJ), all primary care physicians, managed the interviews. In this study, we considered it important to use and analyze the interactions generated by group discussions, and adopted the focus group interview method. Focus group interviews are also suitable for investigating attitudes and experiences [18, 19]. This method is reported to encourage people to talk about difficult content and voice critical opinions [18, 19]. Interviewers need to establish a positive

rapport quickly during in-depth interviews [18]. In response to the interviewer's questions, participants verbalize their own experiences. That verbalization builds on the interactions and social constructions created between the interviewer and the participant [20]. Based on this constructivism recognition, we considered that the authors, who ran the program and facilitated the participants, should act as interviewers, rather than having a third party involved. We felt that this would better promote group dynamics and elicit discussions among the participants [20]. Therefore, the authors acted as interviewers for the focus group interviews. YF had the most experience with interviewing and was therefore the main interviewer, with MS and TJ assisting. These three authors had also managed the program and facilitated the participants' learning over the past 2 years.

The interview time was set at 60 minutes. When one participant responded to a question, several others typically added their opinions. YF asked all the participants questions using the guide questions in chronological order and encouraged participants with relatively few responses to provide additional opinions. In actuality, the interview took 72 minutes. At that point, the interviewer decided that theoretical saturation had been achieved without any further opinions from the participants.

Data analysis

We analyzed the interview records with the Steps for Coding and Theorization (SCAT) method, which is a grounded theory-based thematic analysis approach. SCAT is an analytical method that adds codes in a four-step process, from raw interview data to themes (Table 2) [21-23]. We used this method when conducting a previous study on the needs of participants for the program [10]. SCAT is suitable for the analysis of relatively small samples, such as those used in the previous study, and it was considered appropriate to use SCAT for this study with a similarly small sample [21, 23]. The SCAT method improves reflexivity by looking back at each step, and can be expected to improve the possibility of falsifiability by clarifying the analysis process [21-23]. Therefore, the SCAT method was selected as the analysis method of this study. Using the tape transcript, two authors (MS and TJ) independently coded the text for SCAT steps 1 to 3 [21, 23]. The two authors conferred on conflicting opinions about the content of the code until they reached a joint consensus. Three authors (MS, TJ, and HO) independently conducted the coding for SCAT step 4 [21, 23]. The three authors again conferred and agreed on common themes and constructs about the content of the code.

Table 2. Four steps following the SCAT (Steps for Coding and Theorization) method

| Analysis procedure | Examples |
|--------------------|----------|
|--------------------|----------|

| | | |
|--------|---|---|
| Step 0 | Raw interview data | “I was able to learn systematically, not only biomedical issues but also psychosocial ones, by finding learning topics in scenarios, searching for literature, and considering it logically.” |
| Step 1 | Notable words in step 0 | “learn systematically,” “biomedical issues,” “psychosocial ones,” “searching for literature,” “consider logically” |
| Step 2 | Words that are not in the data to paraphrase step 1 | Principles of family medicine, critical thinking |
| Step 3 | Words to explain step 2 | Experience of being able to apply evidence-based learning methods that were applicable to biological problems to psychosocial problems |
| Step 4 | Themes and constructs that emerge from step 3 | Changes in learning methods regarding medical practice |

Patient and public involvement

There was no patient or public involvement in the design or implementation of this study.

RESULTS

Although our program took place over 2 years with nine participants enrolled, one participant dropped out after only 1 year because of changes in the participant’s medical practice hours. Eight persons completed this program, and all agreed to participate in the interview. The participants’ interview records were organized into three categories: “changes in learning regarding medical practice,” “encounters with diverse perspectives and values, and confidence gained from those encounters,” and “showing one’s attitude towards learning and its influence on others” (Table 3). This section presents excerpts from focus group interviews on these categories.

Table 3. Themes and constructs about changes in behaviors

| Themes and constructs | Phrases |
|--|--|
| I: Changes in learning regarding medical practice | I-i: Search for material and literature, I-ii: psychosocial problems |
| II: Encounters with diverse perspectives and values, and confidence gained from those encounters | II-i: Confidence, no judgment attitude for another's opinion, II-ii: tolerance of diversity, II-iii: no standard re-education program, II-iv: loneliness about own practice |
| III: Showing one's attitude towards learning and its influence on others | III-i: Active transformation of colleagues' learning motivation |

I: Changes in learning regarding medical practice

This theme was subdivided into “search for material and literature (I-i)” and “psychosocial problems (I-ii)”. The participants talked about how they moved from investigating biomedical problems in their daily practice to investigating problems involving biomedical and psychosocial factors.

I-i: Search for material and literature

As primary care physicians, the participants are solving clinical problems related to individual patient consultations. They had few opportunities to reflect on their practice, such as the evidence behind their treatment choices.

“I had never given much thought to my routine practice before, but the program made me dig deeper again into questions such as what guidelines said and what kind of literature there was.” (B)

Secondary materials were often used to search for evidence to support daily practice and to resolve clinical problems. A change in participants' learning occurred in their search for primary materials and raw data, such as statistical data about their learning tasks.

“Now I search not only for secondary materials but also primary materials.” (C, D)

Searching for primary materials was a shift in attitude toward generating opinions based on the participants' own ideas, to present their findings to other participants for discussion.

“All of us in the program gave presentations and had discussions based on statistics we looked up for

ourselves.” (G)

I-ii: Psychosocial problems

Participants were experienced in searching mainly secondary materials about biomedical problems. However, they had limited experience in searching material for information about psychosocial problems. Participants’ learning attitude toward problem solving for various clinical problems changed.

“I was able to learn systematically, not only biomedical issues but also psychosocial ones, by finding learning topics in scenarios, searching for literature, and considering it logically.” (A)

II: Encounters with diverse perspectives and values, and confidence gained from those encounters

This theme was subdivided into “confidence, non-judgmental attitude about other’s opinions (II-i)”, “tolerance of diversity (II-ii)”, “no standard re-education program (II-iii)” and “loneliness about own practice (II-iv)”. Participants who were inexperienced in primary care and operated in isolation at their workplaces described how they had changed after attending the program.

Ii-i: Confidence, non-judgmental attitude about other’s opinions

When presenting their ideas to others, participants were concerned that they would be judged on whether they were correct or incorrect in their presentations. However, the non-judgmental atmosphere supported participants’ learning.

“I felt like I would be judged for my presentation, but there was no critical atmosphere around presentations at all. It was an environment where I could research my learning topic freely and get feedback from everyone.” (D)

II-ii: Tolerance of diversity

The non-judgmental attitude was based on an attitude of respecting individual values and tolerating diversity. These attitudes also encouraged participants to use primary materials and express their own ideas.

“I recognized that it’s not really about whether someone is right or wrong, but that maybe there can be all kinds of physicians.” (E)

II-iii: No standard re-education program

One of the reasons participants lacked confidence in their own thinking and were afraid of being judged was that they had not received standard retraining in primary care. They gained knowledge and skills in primary care by attending the program, but also rediscovered the joy of learning through encounters with diverse values.

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"I dove right into practicing family medicine without training in it. I had no confidence in myself, and I worried about what I should do and how I should study. The first thing that changed in me through participating in this program was meeting all kinds of physicians and encountering many ways of living. The program reminded me of the truth of how enjoyable it is to learn, even though my daily work as a physician is overwhelming, to think hard about my next own learning topic and compare it with what I actually see in my own patients." (H)

II-iv: Loneliness about own practice

Another reason for the lack of confidence and fear of judgment was the loneliness that participants felt in their daily practice. They were generally administrators in their own health care organizations and had no colleagues to talk to about various issues such as patient care, staff management and their own concerns. Encountering diverse values helped to alleviate this loneliness.

"In the clinic, in my position as the manager, even when I get lonely or worry about my relationships with my staff, I have no one to turn to for advice where my clinic is located. The only choice I ever had was to sort things out in my own head. However, by going to a place far away from my clinic and opening up to the people I met there, I learned that I'm not the only one who feels lonely." (H)

Participants felt less lonely, and dealing with diversity allowed them to open up. As a result, the participants realized the depth of their learning.

"I have the impression that the level of learning varies quite a bit depending on how much someone opens themselves up." (C)

III: Showing one's attitude towards learning and its influence on others

This theme had only one subtheme, "active transformation of colleagues' learning motivation (III-i)". Participants saw their own learning change, gained confidence, and also shared their learning with their colleagues. Their own development led others to change too.

III-i: Active transformation of colleagues' learning motivation

Even without setting up a formalized learning session, showing a learning attitude is linked to the learning motivation of other colleagues.

"My staff told me that seeing me hard at work researching issues between examinations showed them that it's possible to learn even when you're busy. They said that when they saw how I studied, it made them want to work harder too." (H)

Showing colleagues the learning content increases their motivation to learn.

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“I now make it a point to tell all of my staff everything I learned about in this program. I make sure to jot down what I learned and put it up in the meeting room.” (A)

Based on the needs of the medical facility to which participants belong and the needs of their colleagues, the sharing of their learning content also led to changes in patient care.

“For instance, I have the staff at my clinic actually write out genograms based on what I learn from my patients. I think it’s given my staff the ability to look at things from the perspective of the families and lifestyles of our patients.” (A)

DISCUSSION

The first behavioral change that emerged in the participants’ statements was a change in learning (Theme I). One participant stated that their literature searches and logical reasoning had changed regarding not only biological issues, but also psychosocial issues. Psychosocial problem-solving is a core competence in family medicine and primary care [24]. The participants in our program have a great deal of practical experience as specialists of different organs and are well-versed in literature searches and logical reasoning for biological issues. In addition to this capacity, our results suggested that completing our program may help participants acquire literature search and logical reasoning capacities for psychosocial issues.

The second behavioral change that emerged was related to encounters with diverse perspectives and values and the confidence gained from those encounters (Theme II). As previous studies have found, the absence of re-education programs often leads to learning in a solitary environment [6, 25]. In Japan, many private physicians engaged in primary care have solo practices [26]. By providing participants with an arena for learning, our program may have encouraged positive changes in the participants’ attitudes. Providing an arena for learning and forming a learning community may be important, regardless of learning style. Further study is necessary to determine whether confidence, a specific change in the participants’ attitudes, results from the PBL approach.

Similarly, participants also spoke favorably about the effect on diversity of our program being held away from the locations where they practice. However, for physicians in rural areas, traveling to such programs is often considered an obstacle to participation [12]. Holding programs online facilitates participation from remote areas. In comparisons of online and on-site education, results are mixed [27]. One participant in our study stated that it is difficult to consult with other medical professionals in her own community about issues encountered with patients. For learning about content highly relevant to the participants’ practices, providing a learning community away from the areas where they practice may foster better learning. Previous studies have also shown that traditional face-to-face lectures are preferred by many CPD participants [28]. However, during the

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6 current COVID-19 pandemic, hosting the program online would reduce the risk of infection.
7 Additionally, health care utilization in Japan has changed. Aoki et al. highlighted the need to
8 strengthen primary care functions such as support for populations with social isolation and
9 multimorbidity [29]. Further research should consider changing the program to an online format and
10 modifying the primary care learning topics to be covered.
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13 Again on the exposure to diverse perspectives, one participant in our study also noted that
14 discussions regarding the results of learning topics and participants' practices and values did not lead
15 to a judgmental atmosphere. A positive atmosphere in classes and groups is considered to bring about
16 cooperative learning, while positive discussions and a learner culture are thought to diversify learning,
17 encourage flexible thinking, and increase creativity [30]. In East Asia, the learning style in medical
18 education is based on Confucian culture [31]. The communication style is expressed as "cultural
19 reticence" [32] – a tendency not to actively express what you know or feel [32]. The level of learning
20 may change depending on the degree to which someone opens themselves up, and a facilitator of
21 learners' presentations and discussions may therefore need skills to provide the learners with a safe
22 discussion atmosphere in which the learners' presentations are not judged as right or wrong and which
23 promotes self-disclosure. Currently, no formal training exists for such facilitators. Going forward,
24 training to help facilitators promote discussion should be conducted while the program is administered.
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27 The third and final behavioral change was the influence on others (Theme III). A previous
28 study suggests that program participants can promote a positive attitude towards learning in their
29 workplace staff and others around them by demonstrating their own positive attitude towards learning
30 and sharing what they have learned [33]. In East Asia, where Confucian influences are strong, students
31 respect teachers, learn from them, and imitate their attitudes [31]. Such a cultural background may
32 also improve the learning attitude of the workplace staff. Further examination of the effects of learning
33 programs will require surveys of the participants' staff and confirmation of changes in patient care.
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36 The Kirkpatrick model was used to evaluate this program [16]. This model is useful because
37 of its clarity in focusing on program outcomes and its clear description of outcomes beyond simple
38 learner satisfaction [16]. However, this model on its own does not provide educators with a complete
39 evaluation of their educational programs [16, 34]. The model has been criticized on the grounds that
40 it does not include intervening variables, such as motivation and learner's entry level, and the
41 relationship between program elements and context [16, 35, 36]. It is necessary to investigate the
42 intervening variables that have affected prior learning, and then conduct interviews with the
43 intervening variables in mind regarding changes in behavior in the study group.
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46 In terms of the three changes in attitude, we will consider whether attending this program
47 was an effective learning exercise for the participants. The FAIR principles (Feedback, Activity,
48 Individualization, and Relevance) are known to be associated with effective learning [37]. The points
49 of Activity and Individualization were achieved by the use of small groups and a learning strategy in
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6 which the learner selects the learning theme using the PBL approach. These points are evident from
7 both the observed change in attitude toward the learning group shown in Theme II and the change in
8 learning shown in Theme I as a result of the learning environment. In addition, the point of Relevance
9 is also satisfied by using a scenario that assumes the site of primary care. This was evident from the
10 fact that the program became a place to learn about problems faced in clinical practice, as described
11 in Theme II. Under the conditions of a solo medical practice and learning environment, and with self-
12 judgment of the correctness of learning tasks, appropriate feedback cannot be obtained from
13 facilitators and other participants. The interview results on Theme II suggest that participating with
14 confidence among participants with a diverse set of values in a non-judgmental environment provided
15 sufficient feedback. Additionally, providing appropriate feedback is one of the competencies required
16 as an educator [38]. Acting as a facilitator is one of the twelve roles of the educator, and feedback is
17 included in this role. The third attitude change in Theme III applies to participants being viewed as
18 role models. Studying in this program may also enhance participants' ability to support other learners
19 as a faculty member. By observing how participants behave as facilitators or role models in clinical
20 and learning settings, it may be possible to assess level 4 stages of the Kirkpatrick model for this
21 program. This aspect could be a subject for future research.

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31 As we aimed for an evaluation that went beyond the satisfaction of taking the course, we
32 chose to address the program evaluation using dimensions corresponding to Kirkpatrick's level 3 and
33 4. We evaluated one aspect of level 4 of the Kirkpatrick model measured through the impact the
34 practitioner had on their colleagues. However, we did not evaluate another aspect of the impact on
35 patient outcomes. As Samuel et al. state in their review, the outcomes corresponding to level 4 of the
36 Kirkpatrick model from CPD programs are not supported by sufficient evidence [28]. Measuring
37 outcomes in terms of patient health and medical economy may be a future research topic for the CPD
38 program. This would require a survey of individual patients' illnesses and health conditions, as well
39 as a survey of management conditions. The outcomes should also investigate what changes have
40 occurred in the staff of the medical institutions to which the participants belong, using the participants
41 as role models.

42 43 44 45 46 47 48 **Limitations**

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The interview in the present study may not necessarily reflect all changes in the attitudes to
learning among the program participants. It would also have been helpful to include the views of the
participant who did not complete the program.

This study is an analysis of a single focus group interview with all participants who
completed the program. Although the participants are experienced primary care physicians, they do
not all have the same level of medical competence and knowledge on the themes of health problems
that are addressed in primary care. In addition, the level of their medical skills and knowledge was not

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verified beforehand. It is possible that changes in the learning attitude of each participant may have been overestimated or underestimated. Future research will require multiple focus groups with larger numbers of participants divided by their subspecialty.

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The interview was conducted by facilitators who had been involved with the program for its 2-year duration. Close involvement in the learning process may have enabled the facilitators to encourage deeper discussion than an interviewer without such involvement. Conversely, the involvement of the interviewers in the learning process may have influenced the discussion about the effective outcomes of the program, as participants might not have wanted to offend the facilitators.

20 21 22 23 24 25 26 27 28 29 **CONCLUSIONS**

This study confirmed that participation in our 2-year CPD program changed participants' learning attitudes and education-related behavior. Our results suggest that support of CPD for primary care physicians requires the preparation of a learning community based on diverse values and perspectives, and the capacity for facilitation to foster the learning community.

30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 **ACKNOWLEDGMENTS**

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For peer review only

STATEMENTS

Contributors

MS conceived the study, contributed to the development of its design, received the JSPS KAKENHI grant, collected the data, and analyzed the qualitative data. YF conceived the study, contributed to the development of the design, and interviewed the participants. MM conceived the study, contributed to the design, and facilitated the focus group interview. TJ facilitated the focus group interview and analyzed the qualitative data. HO analyzed the qualitative data and contributed to the design. YM, IO, and JH conceived the study and contributed to the design. All authors contributed to the drafting of the manuscript, and read and approved the final manuscript.

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Competing interests

MM received lecture fees and lecture travel fees from the Centre for Family Medicine Development of the Japanese Health and Welfare Co-operative Federation. MM is an adviser for the Centre for Family Medicine Development Practice-Based Research Network. The other authors report no conflicts of interest.

Patient consent for publication

Not required

Ethics approval

This study was approved by the Institutional Review Board of the Jikei University School of Medicine (Study number: 27-277[8162]).

Provenance and peer review

Not commissioned; externally peer reviewed.

Data availability statement

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6 Because of the nature of this study, participants did not agree that their data could be shared publicly,
7 so supporting data are not available.
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For peer review only

APPENDIX 1

Primary care themes covered in the Family Medicine Brush-up Program

I. Typical health problems in primary care

| | | |
|----------------------|------------------------|-------------------------|
| Child – old age care | Palliative care | Women’s health |
| Rehabilitation | Mental health problems | Vaccination |
| Chinese medicine | Common emergencies | Musculoskeletal problem |
| Surgery | Ophthalmology | Otorhinolaryngology |

II. The principles of family medicine

| | | |
|-----------------------------------|------------------------|--------------------------------|
| Patient-centered clinical method | Family-oriented care | |
| Biopsychosocial model | Interprofessional work | |
| Prevention and health promotion | Ethics and law | Patient-clinician relationship |
| Healthcare context and continuity | Behavior modification | |
| Complexity and uncertainty | Reflective learning | |

III. Interpersonal and communication skills

| | |
|--------------------------|------------------------------------|
| Medical interview | Laboratory tests in the clinic |
| Clinical problem solving | Evidence-based medicine |
| Professionalism | Minorities and socially vulnerable |
| Facility management | Practice guidelines |

APPENDIX 2

Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

| No | Item | Guide questions/description |
|--------------------------------------|-------------------------|---|
| Domain 1: | | |
| Research team and reflexivity | | |
| Personal Characteristics | | |
| 1. | Interviewer/facilitator | Which author/s conducted the interview or focus group? Yasuki Fujinuma conducted the focus group interview. Masayasu Seki and Tatsuhiko Joki assisted. Page 7. Masayasu Seki, MD, PhD Yasuki Fujinuma, MD Masato Matsushima, MD, PhD, MPH Tatsuhiko Joki, MD, PhD Hideo Okonogi, MD, PhD Yasuhiko Miura, MD, PhD |
| 2. | Credentials | What were the researchers' credentials? <i>E.g., PhD, MD</i> Jun Hiramoto, MD, PhD Iwao Ohno, MD, PhD. Page 1. |

| No | Item | Guide questions/description | |
|--------------------------------|--|---|---|
| 3. | Occupation | What was their occupation at the time of the study? | All researchers were primary care physician. Page 1. |
| 4. | Gender | Was the researcher male or female? | All researchers were male. Page 1. |
| 5. | Experience and training | What experience or training did the researcher have? | We conducted this research using the same analysis as for a previous study. Page 4. |
| Relationship with participants | | | |
| 6. | Relationship established | Was a relationship established prior to study commencement? | Participants were interviewed after taking the Family Medicine Brush-up Program for two years. Interviewers facilitated the program. Page 4, 5. |
| 7. | Participant knowledge of the interviewer | What did the participants know about the researcher? e.g., | The participants received an explanation of the taped focus group interview process and gave their consent to participate. Page 5, 6, 7. |

| No | Item | Guide questions/description | |
|-------------------------------|---------------------------------------|---|---|
| | | <i>personal goals, reasons for doing the research</i> | |
| 8. | Interviewer characteristics | What characteristics were reported about the interviewer/facilitator? e.g., <i>Bias, assumptions, reasons and interests in the research topic</i> | The main interviewer (Yasuki Fuchinuma) was practicing primary care and was engaged in research and education activities in family medicine. Page 7. |
| Domain 2: study design | | | |
| | Theoretical framework | | |
| 9. | Methodological orientation and theory | What methodological orientation was stated to underpin the study? e.g., <i>grounded theory, discourse analysis, ethnography,</i> | We analyzed the interview records with the Steps for Coding and Theorization (SCAT) method which is a grounded theory-based thematic analysis approach. This method is suitable for the analysis of relatively small samples. The SCAT method improves reflexivity by looking back each |

| No | Item | Guide questions/description | |
|-----------------------|--------------------|--|--|
| | | <i>phenomenology, content analysis</i> | steps, and can be expected to improve the possibility of falsifiability by clarifying the analysis process. Page 7, 8. |
| Participant selection | | | |
| 10. | Sampling | How were participants selected? <i>e.g., purposive, convenience, consecutive, snowball</i> | Participants were all those who had completed the two-year program. Page 5, 6. |
| 11. | Method of approach | How were participants approached? <i>e.g., face-to-face, telephone, mail, email</i> | Face-to-face. Page 6, 7. |
| 12. | Sample size | How many participants were in the study? | 8 participants. Page 5, 6. |
| 13. | Non-participation | How many people refused to participate or dropped out? Reasons? | None. Page 5, 6. |

| No | Item | Guide questions/description | |
|-----------------|------------------------------|---|---|
| Setting | | | |
| 14. | Setting of data collection | Where was the data collected? <i>e.g., home, clinic, workplace</i> | The participants were interviewed in a quiet room undisturbed by daily activities. Page 7. |
| 15. | Presence of non-participants | Was anyone else present besides the participants and researchers? | No. Page 6, 7. |
| 16. | Description of sample | What are the important characteristics of the sample? <i>e.g., demographic data, date</i> | Eight participants completed the Family Medicine Brush-up Program targeting physicians who had not undertaken specialist training in family medicine and had qualified at least 10 years previously. Page 5, 6. |
| Data collection | | | |
| 17. | Interview guide | Were questions, prompts, guides provided by the authors? Was it pilot tested? | The interview was conducted using the guiding questions and was not pilot tested. Page 6, 7. |

| No | Item | Guide questions/description | |
|-----|------------------------|--|---|
| 18. | Repeat interviews | Were repeat interviews carried out? If yes, how many? | A single focus group interview was conducted. Page 5, 6. |
| 19. | Audio/visual recording | Did the research use audio or visual recording to collect the data? | The interview was audio-recorded using a digital recorder. Page 5, 6. |
| 20. | Field notes | Were field notes made during and/or after the interview or focus group? | Yes. Page 6, 7. |
| 21. | Duration | What was the duration of the interviews or focus group? | 72 minutes. Page 7. |
| 22. | Data saturation | Was data saturation discussed? | Saturation was defined as the point with no new comments from the participants. Page 7. |
| 23. | Transcripts returned | Were transcripts returned to participants for comment and/or correction? | No. Page 7. |

| No | Item | Guide questions/description | |
|--|--------------------------------|---|---|
| Domain 3: analysis and findings | | | |
| Data analysis | | | |
| 24. | Number of data coders | How many data coders coded the data? | Two. Page 7. |
| 25. | Description of the coding tree | Did authors provide a description of the coding tree? | Yes (see results). Page 7, 8. |
| 26. | Derivation of themes | Were themes identified in advance or derived from the data? | Themes were derived from the data. Page 7, 8. |
| 27. | Software | What software, if applicable, was used to manage the data? | Not applicable. Page 7. |
| 28. | Participant checking | Did participants provide feedback on the findings? | No. Page 7. |

| No | Item | Guide questions/description | |
|-----------|------------------------------|--|--|
| Reporting | | | |
| 29. | Quotations presented | Were participant quotations presented to illustrate the themes/ findings? Was each quotation identified? e.g., <i>participant number</i> | Yes, quotations are presented and identified. Page 8, 9. |
| 30. | Data and findings consistent | Was there consistency between the data presented and the findings? | Yes. Page 8, 9, 10, 11. |
| 31. | Clarity of major themes | Were major themes clearly presented in the findings? | Yes. Page 8, 9. |
| 32. | Clarity of minor themes | Is there a description of diverse cases or discussion of minor themes? | Yes. Page 8, 9, 10, 11. |

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|-------------------------------|---------------------------------------|---|---|
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| No | Item | Guide questions/description | |
|-----------------|------------------------------|---|---|
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| 14. | Setting of data collection | Where was the data collected? <i>e.g., home, clinic, workplace</i> | The participants were interviewed in a quiet room undisturbed by daily activities. Page 7. |
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