



EVALUATION OF THE TRAINEES' REACTIONS TO THE SAUDI BOARD FAMILY MEDICINE PROGRAMME: APPLYING THE KIRKPATRICK LEVEL-I EVALUATION MODEL

Medicine

Wejdan S. Manah* Department of Saudi Postgraduate Family Medicine Program, Ministry of Health (MOH), Eastern Province, Saudi Arabia *Corresponding Author

Rasha S. Al-Besher Department of Saudi Postgraduate Family Medicine Program, Ministry of Health (MOH), Eastern Province, Saudi Arabia

Abdullah D. Al-Khathami Family and Community Medicine, MOH, Eastern Province, Saudi Arabia

ABSTRACT

The learner-centred learning (LCL) model was implemented as a training approach through a 5-day training of trainers (TOT) course in classes, clinics, and supervising office meetings. This study aimed to assess trainees' reactions to the Saudi Board of Family Medicine Program - Ministry of Health, Eastern Province (SBFM-MOH-EP). A cross-sectional survey was given to 99 trainees in April 2018 using the Kirkpatrick Model-reaction. It comprised the trainees' reactions to the curriculum, trainers' performance, training facilities, and improvement areas. Curriculum content, trainers' performance, and training facilities received a high percentage of positive responses. However, dissatisfaction was high regarding the balance between theoretical and practical learning, session summarising, trainers' assessment based on EBM, and considering trainees' agreement before providing feedback. Therefore, preparing the trainers through TOT courses to model their training after the LCL model with effective structured supervision meetings is valuable for promoting better training outcomes.

KEYWORDS

learner-centred learning, Kirkpatrick Model, evaluation, training

1. BACKGROUND

Active learning has received significant consideration in the last decade by transforming education from teacher-centred learning to student-centred learning (Crosby & Harden, 2000). Learner-centred learning (LCL), or student-centred learning, is defined as an 'instructional approach in which the learner influences the content, activities, material, and pace of learning' (Seng, 2014). It is a collaborative, social, self-learning, cognitive and metacognitive, motivational, and formative assessment (Tawalbeh & AIAsmari, 2015).

The LCL model has been chosen as an innovative development of the Saudi Board of Family Medicine Program - Ministry of Health, Eastern Province (SBFM-MOH-EP). In the implementation stage, all the trainers were prepared through 5-day training of trainers' (TOT) courses: how to be efficient trainers in classes, clinics, and supervising office meetings (Al-Khathami, 2018). The changes of small group techniques and methods were implemented through the learning delivery process with constructive feedback and reflection. The assessment method is primarily formative, defining learning gaps and assessing the trainees' achievement during regular structured supervision meetings. Such an approach was found to be essential for the programmes' improvement (McAlee, 2001).

This study aimed to assess trainees' reactions to the training components based on the Kirkpatrick model for further improvement (Kirkpatrick & Kirkpatrick, 2012).

2. Methods

This study was cross-sectional and conducted in the Eastern Province of Saudi Arabia. The study focus was to evaluate the SBFM-MOH-EP based on the Kirkpatrick evaluation model's reaction dimension in April 2018. The trainees' reactions to the curriculum, trainers' performance, training materials, and facilities were measured to defining the strengths, weaknesses, and improvement areas of the SBFM-MOH-EP. Sociodemographic data, training levels, and work experience were identified as independent variables for comparative purposes.

Sample:

FM residents at training levels R1, R2, R3, and R4 were included in the study if they met the criteria of completion of six months of their training in that academic year. The sample size was 99 out of 108 trainees who qualified for the study, giving a response rate of 91%.

The Kirkpatrick Model:

The Kirkpatrick Model's reaction dimension was used as a framework

for the training programme evaluation. The reaction dimension evaluates the trainees' reaction to training content, including curriculum structure, trainers' performance, training processes, and overall reaction (Watkins et al., 1998).

Questionnaire:

A self-administered questionnaire was formulated to assess the programme on the reaction dimension of the Kirkpatrick Model. The questionnaire consisted of five main parts: demographic description; reaction to the curriculum; trainers' performance; training materials and facilities; and qualitative, open-ended questions to assess the strengths, weakness, and potential improvement areas. The reaction assessments were assessed using a 5-point Likert-type scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree). The internal consistency test for the questionnaire resulted in a high Cronbach's alpha correlation coefficient of $\alpha = 0.78$.

Pilot study:

A pilot study was conducted to address the feasibility of the research tool (Hassan et al., 2006). The test-retest method was used to assess the internal reliability and temporal stability of the questionnaire (Christodoulou et al., 2015). Thirty trainees from different levels were included in the pilot study, but not included in the primary study.

Data analysis:

All collected data were checked, coded, and entered into the Statistical Package for Social Sciences (SPSS version 22) for data analysis. Overall scores for the reaction assessments were calculated. Correlational assessments were used, along with an analysis of variance (ANOVA) and t-tests. Probability values of $p < 0.05$ were considered statistically significant. The qualitative data from the open-ended questions were analysed thematically, and items repeated by three or more trainees were considered valuable issues.

Ethics:

This study was approved by the MOH Health Research Committee in the Eastern Province. Informed consent clauses were provided on the front page of the questionnaire. Confidentiality and anonymity were ensured.

3. RESULTS

Table 1 shows the demographic data of the 108 participants. After eliminating questionnaires with missing data, 99 trainees met the inclusion criteria, giving a response rate of 91%. The trainees comprised 67 (68%) women and the mean experience as a trainee in another programme was 5 ± 3 years. Most participants (87.9%) did not

have experience as trainees in another programme before being enrolled in the FM programme.

Table 1: Trainees' demographic data

Demographic	Category	n (%)
Age (years)	< 25	8 (8%)
	26–30	72 (73%)
	> 30	19 (19%)
Marital status	Single	20 (20%)
	Married	74 (75%)
	Separate	2 (2%)
	Divorced	2 (2%)
	Widow	1 (1%)
Number of children	None	47 (48%)

Training level	1–2	44 (45%)
	≥ 3	8 (8%)
	R1	27 (27%)
	R2	21 (21%)
	R3	37 (38%)
	R4	14 (14%)

Table 2 reflects the trainees' reactions to the SBFM-MOH-EP curriculum. These results show the participants' agreement with the statements. On average, 76.8% (range 68–84%) of participants indicated that they agreed with the questionnaire items. Most trainees stated that they agreed or strongly agreed with most of the evaluations of the items, ranging between 63% and 92% agreement. However, 46% participants either did not agree with, or were neutral to, the item referring to balance between theoretical and practical learning.

Table 2: Reactions to the SBFM-MOH-EP curriculum based on the Kirkpatrick level-I evaluation model

Curriculum assessment items	Strongly disagree N	Disagree N	Neutral N	Agree N	Strongly agree N	Average percentage
1. Topics are relevant to my future career as family physician	1	1	6	50	41	86.0
2. Programme goals and objective were clearly stated	2	5	11	54	27	80.0
3. Topics are fulfilling my learning needs	1	5	17	51	25	79.0
4. Hospital rotations added to my diagnosis and management judgment	2	8	19	41	29	77.6
5. Hospital rotations improve my clinical skills	3	7	21	42	26	76.4
6. Hospital rotations added to my knowledge	2	8	25	37	27	76.0
7. Theory part is applicable in clinical practice	4	9	24	51	11	71.4
8. There is a balance between theoretical and practical learning in family medicine	2	15	29	47	6	68.2
Overall average	76.8					

Table 3 reflects the trainees' reactions to the SBFM-MOH-EP trainers. These results show that most of the participants (76.8%, range 68–84%) agreed with all the statements. Most of them agreed with all evaluation items, with a range of 52–86%. However, areas with lower scores include the trainers' performance in dealing with scientific

conflict appropriately (36%), summarising at the end of the sessions (39%), trainers' assessment based on evidence-based medicine (EBM) (26%), and ensuring trainees' agreement regarding identified learning gaps before providing feedback (47%).

Table 3: Trainees' reactions to SBFM-MOH-EP trainers' performance based on the Kirkpatrick level-I evaluation model

Trainers' performance assessment	Strongly disagree N	Disagree N	Neutral N	Agree N	Strongly agree N	Average percentage
1. Trainers have effective communication skills enhancing my participation	2	6	24	44	23	76.2
2. Trainers are capable of managing the time	0	5	28	54	12	74.8
3. Trainers respond well to my questions	0	7	24	45	23	77.0
4. A variety of small group teaching methods are applied	0	4	14	54	27	81.0
5. Trainers are capable of running small group teaching	0	1	13	57	28	82.6
6. Trainers are interested in clinical teaching	4	6	21	48	20	75.0
7. Trainers can help me to define my clinical needs	2	9	24	45	19	74.2
8. Trainers motivate my learning and create and maintain a safe learning environment	3	2	30	41	23	76.0
9. Trainers deal with scientific conflict appropriately	4	8	24	49	14	72.4
10. Trainers summarised the learning at the end of sessions	1	9	29	51	9	71.8
11. In the clinic, the trainers assure appropriate communication skills are applied	2	3	14	60	20	78.0
12. In the clinic, trainers assure using a biopsychosocial approach	2	3	9	55	30	81.8
13. Trainers are helpful in guidance and learning	2	7	21	47	22	76.2
14. Trainers assess my evidence according to evidence-based medicine	0	10	16	57	16	76.0
15. Trainers help me to achieve my learning gaps	2	4	16	58	19	77.8
16. Trainers ensure my agreement with the learning gaps before providing feedback	4	12	31	27	25	71.4
17. Supervision meetings identify my learning gaps	3	4	22	36	34	79.0
18. Supervision meetings help me to improve my clinical judgment and reasoning	1	6	20	36	36	80.2
19. Supervision meetings help to improve overall performance	2	5	22	36	34	78.4
Overall average	76.8					

Table 4 reflects the trainees' reaction to the SBFM-MOH-EP materials and facilities. These results show that most participants (69.1%) agreed with all statements. This mean was achieved in the second item (agree) of the 5-item scale (68–84%), which indicated agreement with the questionnaire items. Most of the trainees agreed with the items

measuring the availability and structure of materials, and that the audio-visual and flipchart were helpful. About 50% disagreed with, or were neutral to, the item regarding the clinic equipment and the status of the supervision meeting offices. Most of the trainees disagreed with the statement that the classroom assisted learning.

Table 4: Trainees' reactions about SBFM-MOH-EP materials and facilities applying the Kirkpatrick level-I evaluation model

Materials and Facilities Items	Strongly disagree N	Disagree N	Neutral N	Agree N	Strongly agree N	Average percentage
1. Materials used in the teaching session are available and appropriate (handout, case scenarios...)	3	7	16	44	29	78.0
2. Audio-visual programme helps me in learning	1	6	13	46	33	81.0
3. Smart board, flipchart help me in learning	1	2	17	46	33	81.8
4. Classroom assists the learning	7	16	22	34	20	69.0
5. Family medicine clinics are well equipped	19	28	29	14	9	53.2
6. Supervision meeting rooms are appropriate	28	21	28	10	12	51.4
Overall average	69.1					

The mean trainers' score differed significantly by residency level based on ANOVA ($p = 0.016$). The R2 group had the highest mean trainers' score (77 ± 8), although similar scores were observed for R1 (74 ± 12) and R3 (74 ± 12), while R4 had the lowest mean (64 ± 18). The curriculum and material mean scores did not differ significantly based on an ANOVA with the demographic factors reflecting age category, marital status, level of the trainee, number of children, and number of years since graduation. Trainees' gender influenced the participants' perception, where males more strongly favoured the trainers' performance in the following items: 'trainers are helpful in defining the trainees' clinical needs' ($p = 0.043$), 'helpful in guidance and support learning' ($p = 0.010$), and 'help trainees achieve their learning gaps' ($p = 0.012$). Age category showed significant differences: participants over 30 years of age showed significant differences in the trainers' sections 'applying of small group teaching methods' ($p = 0.034$) and 'dealing with scientific conflicts' ($p = 0.011$).

In addition to the above-mentioned quantitative approach, the qualitative research was applied in the form of interpretation of the open-ended questions. The response rates for the open-ended (qualitative) question themes of 'strength', 'weakness', and 'improvement areas' were 89%, 85%, and 81%, respectively. The answers were clustered into six themes: trainers' performance assessments, training assignments, training rotations in FM practices and hospitals, teaching and learning activities, training environment, and learning facilities. To add value, points mentioned by at least three trainees counted as perceptions, as illustrated in Table 5.

Table 5: Strengths, weaknesses, and improvement areas for the postgraduate SBFM-MOH-EP based on the Kirkpatrick level-I evaluation model

<p>Theme 1: Trainers' Performance Assessment</p> <p>Strengths:</p> <ul style="list-style-type: none"> • Good communication • Effective, cooperative learning environment <p>Weaknesses:</p> <ul style="list-style-type: none"> • A large number of trainees compared to the number of trainers • Some trainers were not well prepared as qualified trainers • Some trainers did not prepare well to present their topics <p>Improvement Areas:</p> <ul style="list-style-type: none"> • Increase the numbers of properly qualified trainers
<p>Theme 2: Training Assignments</p> <p>Strengths:</p> <ul style="list-style-type: none"> • Effective, continuous supervision meetings between the trainees and their supervisors to define the trainees' learning gaps and guide them in addressing them <p>Weaknesses:</p> <ul style="list-style-type: none"> • Many assignments were required <p>Improvement Areas: NPR*</p>
<p>Theme 3: Training Rotations in Family Medicine (FM) Practices and Hospitals</p> <p>Strengths:</p> <ul style="list-style-type: none"> • Good FM clinical learning based on exposure to cases • Good exposure to cases in the hospital rotations <p>Weaknesses:</p> <ul style="list-style-type: none"> • There are no FM clinics included in the hospital rotations • Some of the trainers were not available in their clinic <p>Improvement Areas:</p> <ul style="list-style-type: none"> • To include FM clinics weekly during the hospital rotations to ensure practicing of FM throughout the training process • Mandatory availability of FM trainers in their training clinics
<p>Theme 4: Teaching and Learning Activities</p> <p>Strengths:</p> <ul style="list-style-type: none"> • Good feedback and discussions • No homework tasks • Applying evidence-based medicine in clinical practice • Learning model is a learner-centred approach • Applying efficient teaching methods, including small group learning • Trainees were responsible for presenting lectures under the supervision of the Half Day Release Activity (HDRA) <p>Weaknesses:</p> <ul style="list-style-type: none"> • Large numbers of trainees in classrooms during the HDRA <p>Improvement Areas:</p> <ul style="list-style-type: none"> • Collaborating with external trainers in the classroom activities to exchange experiences

<p>Theme 5: Training Environment</p> <p>Strengths:</p> <ul style="list-style-type: none"> • Comfortable for learning • Safe, encouraging, supportive, effective, and friendly environment • The programme administration was very supportive <p>Weaknesses: NPR*</p> <p>Improvement Areas: NPR*</p>
<p>Theme 6: Learning Facilities</p> <p>Strengths: NPR*</p> <p>Weaknesses:</p> <ul style="list-style-type: none"> • FM clinics were not well equipped • Lack of classroom spaces and number of classrooms • Lack of supervision meeting rooms, skill laboratories, and adequate number of toilets <p>Improvement Areas:</p> <ul style="list-style-type: none"> • Provide a library, skills laboratory, and simulation stations • Prepare the FM clinics with the required equipment • More classrooms, supervision meeting rooms, and refreshment facilities

* NPR=No Point Raised

4. DISCUSSION

There were more female trainees than male, which is congruent with other national and international studies (Al Shareef, 2014; Carney et al., 2016). A possible explanation is that the FM specialty is preferable to female aspirants.

The balance between theoretical learning and practical application represented a less positive finding, which also follows other studies' findings (Murai et al., 2005; Yaman & Özen, 2002; Leigh et al., 2006). This could indicate an inadequate clinical practice and an emphasis on providing more practical training skills. Therefore, to close the gap between the theoretical and practical components, the curriculum should consider a model which promotes depth of understanding, discovery, and active contribution in the learning process. Thus, a curriculum designed to promote self-directed learning (Spencer & Jordan, 1999) in parallel with strengthening practical aspects is likely to be the most effective form of training.

The LCL model has been shown to be very efficient in meeting the educational needs of all trainees (Nuur Ali et al., 2018). It improves self-learning, trainees' motivation, retention of knowledge, deep understanding, and facilitates a positive attitude to the subject being taught (Edwards et al., 1988; Seng, 2014). Furthermore, updating the curriculum based on the trainees' needs and medical education is essential for achieving these goals (Morrison, 2003).

Murai et al. (2005) and Willey et al. (2018) suggested that reforming the curriculum to combine theoretical and practical sessions with more active modern teaching methods, such as the LCL model, will improve the diagnostic skills of early-stage trainees and could correct the deficiency in practical learning. Such findings call for implementing the LCL model in curriculum development.

The trainers' performance, which is considered an important part of any training programme (Menachery et al., 2008; Wright, 2011). Applying LCL principles in the training process drew positive reactions from trainees, consistent with other studies regarding trainees' satisfaction with their trainers' performance (Al-Khaldi, 2017; Giangreco et al., 2009). However, some areas need more attention in the trainers' preparation stage, such as dealing with scientific conflicts, summarising training sessions, providing feedback based on EBM, and trainees' agreement.

Another issue is the training facilities lacking required materials, which decreased the trainees' productivity and quality level (Mosadeghrad, 2014). This should be considered in the accreditation process for the training centres.

The qualitative section of this study provided positive evidence supporting the benefit of applying LCL principles such as a safe environment, learning collaboration and facilitation, and applying small group learning methods. Utilisation of the supervision meeting assessments and no-home tasks, which encouraged and motivated trainees' improvement and academic achievements, was strongly preferred (Edwards et al., 1988; Morrison, 2003; Seng, 2014). The

portfolio as a learning assessment used in meetings between trainees and their trainers should focus on the trainees' learning gaps, how to bridge learning gaps, and how to achieve training objectives, rather than only on completing the assessment forms (Patil & Lee, 2002). Furthermore, the low proportion of trainers to trainees could lead to inadequate supervision and negatively affect attempts at improvement (Al-Khaldi, 2017; D'Ottavio, 2018; Mbuka et al., 2016).

5. CONCLUSIONS

Implementing the LCL model in a training programme is an innovative developmental step started by conducting structured 3-TOT programmes (how to be efficient trainers in classes, clinics, and supervising office meetings). Furthermore, effective structured supervision meetings are valuable for promoting positive training outcomes. This study was limited by time restraints that did not permit comparison against trainees' reactions to traditional training programs that did not apply the LCL model. Further research exploring levels II, III, and IV of Kirkpatrick's Model is required.

Abbreviations

training of trainers (TOT), learner-centred learning (LCL), family medicine (FM), analysis of variance (ANOVA), evidence-based medicine (EBM), Saudi Board of Family Medicine Program - Ministry of Health, Eastern Province (SBFM-MOH-EP), Half Day Release Activity (HDRA)

Declarations

Ethics approval and consent to participate: This study was approved by the MOH Health Research Committee in the Eastern Province. Informed consent clauses were provided on the front page of the questionnaire. Confidentiality and anonymity were ensured.

Consent for publication: Not applicable.

Availability of data and materials: The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests: The authors declare that they have no competing interests.

Funding: None.

Authors' contributions: WM analysed data, wrote the paper, and was a major contributor in writing the manuscript. RB performed research. AK designed the study and contributed to the model. All authors read and approved the final manuscript.

ACKNOWLEDGMENTS: Thanks to Dr Mohammed Al-amen for his contribution to the data analysis. We are also very grateful to all the trainees who participated in this study. Finally, we appreciate efforts of the programme staff in applying the modern learning LCL model. We would like to thank Editage (www.editage.com) for English language editing.

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