

Reflection as a Learning Tool in Graduate Medical Education: A Systematic Review

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ABSTRACT

Background Graduate medical education programs employ reflection to advance a range of outcomes for physicians in training. However, the most effective applications of this tool have not been fully explored.

Objective A systematic review of the literature examined interventions reporting the use of reflection in graduate medical education.

Methods The authors searched Medline/PubMed, Embase, Cochrane CENTRAL, and ERIC for studies of reflection as a teaching tool to develop medical trainees' capacities. Key words and subject headings included *reflection, narrative, residents/GME, and education/teaching/learning*. No language or date limits were applied. The search yielded 1308 citations between inception for each database and June 15, 2015. A total of 16 studies, encompassing 477 residents and fellows, met eligibility criteria. Study quality was assessed using the Critical Appraisal Skills Programme Qualitative Checklist. The authors conducted a thematic analysis of the 16 articles.

Results Outcomes studied encompassed the impact of reflection on empathy, comfort with learning in complex situations, and engagement in the learning process. Reflection increased learning of complex subjects and deepened professional values. It appears to be an effective tool for improving attitudes and comfort when exploring difficult material. Limitations include that most studies had small samples, used volunteers, and did not measure behavioral outcomes.

Conclusions Critical reflection is a tool that can amplify learning in residents and fellows. Added research is needed to understand how reflection can influence growth in professional capacities and patient-level outcomes in ways that can be measured.

Introduction

Reflection is considered a critical component of learning in graduate medical education (GME).¹⁻⁴ By reflecting on experiences, residents and fellows develop self-regulated learning skills that can lead to enhanced competence, humanism, and professionalism.^{1,5-11} Theory supports reflection as a means to advance knowledge, guide future learning, deepen understanding of complex concepts, and explore emotionally challenging situations.^{1,12-14} However, the impact of reflection on medical trainees and its most effective use in GME remain unclear.

We conducted a systematic review of the literature to evaluate the available evidence on the impact reflection has in GME. Reflection is defined in several ways. For this review, we used the definition by Mann and colleagues,¹ which includes a framework for reflection, involving critical thinking, exploration of personal and emotional experiences, and examination of the impact of actions. Our review also focused on studies that measured the effect of reflection on resident/fellow capacities. Our objective was to

identify elements of reflection that could support positive change in physicians in training.

Methods

A health sciences librarian trained in systematic reviews (J.N.) developed and conducted searches in Medline/PubMed, Embase, Cochrane CENTRAL, and ERIC through June 15, 2015. The search combined relevant key words and subject headings for the 3 concepts of reflection/narrative, residents/GME, and education/teaching/learning. The search used no language, country, or date limits.

The FIGURE provides the preferred reporting items for systematic reviews and the flow diagram outlining the review methods. After eliminating duplication, 1308 studies were screened for eligibility using a 2-step process that included only studies in GME and studies that used reflection as an intervention.

A total of 1308 abstracts/titles were screened, which resulted in the exclusion of 1192 articles. Pairs of team members conducted full-text screenings of the 116 remaining articles, which produced 16 eligible studies, for which data were extracted into a standardized template. Conflicts in inclusion and data extraction were resolved through discussion.

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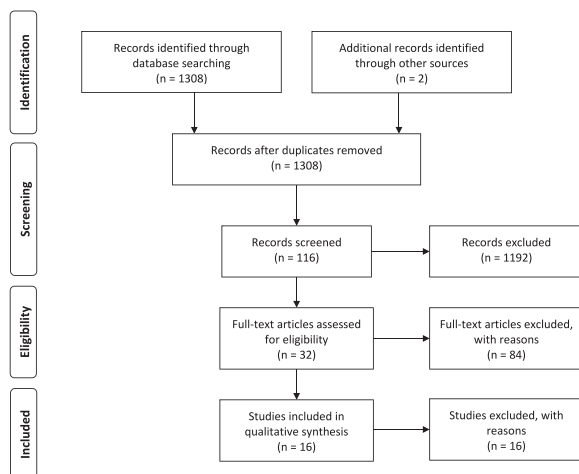


FIGURE
PRISMA Flow Diagram

Following data extraction, team members assessed study quality using the Critical Appraisal Skills Programme (CASP) Qualitative Checklist. This checklist focuses on the validity, content, and relevance of the research design, data collection, and analysis. All studies included in the review satisfied CASP criteria. We conducted a thematic analysis that focused on the core areas of interest in the reported study results.

Results

Sixteen studies using reflection in GME were included in the final review. The TABLE shows details on participants and settings, the interventions, and the outcomes studied. The results of thematic analysis are listed in the “Focus” column of the TABLE.

Impact of Training on the Quality of Reflection

Four studies explored the impact of reflective exercises on the reflective capacity of trainees.^{3,15–17} George et al¹⁵ enrolled 25 second-year family medicine residents in monthly coaching sessions. Residents set goals and entered written reflections in a web-based portfolio. The findings showed deepening reflective ability over time.

Khanum¹⁶ created a curriculum of reflective exercises for 24 obstetrics and gynecology residents. Residents completed reflective exercises focusing on learning challenges. While participants varied in reflective ability, as a group they demonstrated deeper reflection over time.

Levine and colleagues¹⁷ examined the impact of reflective writing on 32 first-year internal medicine residents from 9 programs. Participants volunteered to write serial narrative reflections over 1 year. The

authors focused on meaningful segments in the writing, which showed increased depth of reflection over time.

Impact of Reflection on Learning

Most models of reflection underscore its critical role in the learning cycle: synthesizing learning and discovering connections within an educational experience.¹ Six studies described connections between reflection and learning in practice.^{3,15,17–20}

Bernard and colleagues¹⁸ investigated the use of a social media platform for reflection in an emergency medicine residency. Reflections from 37 residents and 34 faculty members were analyzed using a constant comparison approach. The value of learning from shared reflections was supported in the analysis.

Bethune and Brown¹⁹ used case-based reflective exercises with 57 family medicine residents. Eight of these residents participated in semistructured interviews on the impact of reflection, and reported reflection informed their strategies for future learning and influenced patient interactions.

George et al¹⁵ also assessed goal setting using a web-based portfolio. The authors attributed the residents’ increasingly complex learning goals to a learning process driven by reflection.

Levine et al¹⁷ also assessed for enhanced learning through reflections, with residents demonstrating increased self-awareness and a reconsideration of their core values. The authors concluded that reflection served the following multiple functions for residents: a venue for expressing emotions, a forum for clarifying learning goals, and a source of motivation to improve.

Toy and colleagues²⁰ explored the impact of reflection on learning goals for clinical behaviors. Sixteen obstetrics and gynecology residents engaged in monthly reflection and goal setting. Participants increased their number of logged procedures and documented cases, which the authors interpreted as evidence of increased engagement in learning.

Miller Juve³ also examined self-directed learning by residents engaged in writing reflections. No change was seen between pre- and posttest, yet participants reported that reflective practice would aid their future learning.

These studies suggest that the act of engaging in reflection might motivate future clinical behavior in practice.

Impact of Reflection on Developing Professionalism

Seven studies explored reflection as a means to develop residents’ professionalism.^{2,5,18,19,21–23} Four

studies examined individual-level professionalism, and 3 looked at professional connections within a community of care.

Bethune and Brown¹⁹ explored 8 family medicine graduates' perceptions of the role of reflective exercises in training. Respondents reported that reflection influenced their developing professional identities by encouraging personal insights and offering a different perspective on patient interactions, potentially enhancing the development of their professional identity.

Kung and colleagues² developed a professionalism and ethics curriculum for 30 radiology residents that consisted of 6 reflective sessions. Using a pre-/posttest design, the authors found no changes in self-reported professionalism overall, although there were some positive changes in concepts of accountability, honor, integrity, enrichment, and duty.

Adams and colleagues⁵ introduced Balint training to 16 obstetrics and gynecology residents. While pre- and posttest assessments did not show significant changes, participants reported that reflection produced valuable insights about patient care and a sense of community building.

Maurer et al²¹ studied 52 internal medicine and 8 psychiatry residents engaged in narrative medicine sessions on a geriatric rotation. Pretests and posttests revealed an improvement in residents' knowledge, skills, and attitudes about geriatric care.

Nothnagle and colleagues²² studied 22 family medicine residents enrolled in seminars that used reflection to promote self-directed learning and professionalism. A thematic analysis of semistructured interviews and field notes revealed residents believed the sessions enabled community building and practical application of professional values.

The analysis by Bernard et al¹⁸ also showed shared reflection as a positive influence in approaching challenging cases.

DasGupta and colleagues²³ introduced monthly reading and discussion sessions for 18 pediatrics residents and 16 community health workers as part of a community medicine rotation. Residents and community health workers reported increased understanding of other perspectives, medical culture, and the importance of diversity.

Studies on the impact of reflection on individual professionalism produce mixed findings. At the same time, participants reported that reflection helped them solidify professional values and, combined with clinical activities, reflection appeared to positively influence connections within a community of practice.

Impact of Reflection on Empathy and Communication Skills

Five studies examined whether participation in structured reflection improved trainees' communication skills and empathy toward patients.^{12,17,24–26}

Learman et al²⁴ studied 32 obstetrics and gynecology residents to assess the quality of resident reflections and performance. Participants completed case-based reflection exercises, which were scored by faculty. This showed a correlation between the depth of residents' reflection and the quality of communication skills (rated by allied health professionals and medical students).

Ballon and Skinner²⁵ studied reflective elements in an addiction curriculum for 28 psychiatry residents. A postrotation questionnaire revealed increased comfort with difficult content, and participants also reported increased comfort providing critical feedback to patients.

Winkel and colleagues²⁶ instituted a narrative medicine curriculum consisting of 6 reflective writing seminars for 18 obstetrics and gynecology residents. Pre-/posttest surveys measuring burnout and empathy showed no significant differences. Residents enjoyed the sessions, but reported that they did not believe the sessions would affect their interactions with patients.

Epner and Baile¹² introduced a "difficult conversations" seminar for 26 first-year oncology fellows. Fellows participated in monthly sessions led by peers using dramatic techniques, reflective writing, and Balint-type discussion groups. Analysis of written reflections and surveys revealed fellows valued the curriculum and felt it enhanced their communication skills.

A study of narrative reflections by 32 internal medicine interns by Levine and colleagues¹⁷ showed improved self-awareness. Residents reported the reflections served as an emotional outlet and motivated them to improve their connections with patients.

Among these studies, there is insufficient evidence to assess the impact of reflection on empathy or patient communication. Participants reported improved awareness and attitudes toward their patients, but studies did not assess whether changes in attitudes resulted in a measurable changes in resident skills for interacting with patients.

Reflection and Trainee Comfort With Complex or Difficult Situations

Two studies explored whether reflection increased trainee comfort with complex or challenging situations.^{12,25}

TABLE
Studies Examining the Impact of Educational Activities Involving Reflection on Residents and Fellows

Source, y	Setting and Participants	Intervention	Research Question(s)	Methods	Focus	Findings	Limitations
Adams et al, ⁵ 2006	Academic university health center; obstetrics and gynecology residents (N = 16)	Balint training (small group discussions of patient/physician interactions)	Does resident professionalism change after reflection training via Balint groups?	Pre-/posttest assessment of professionalism by faculty and residents; subjective assessment of participation in Balint groups by residents	Professionalism	No change in faculty or resident professionalism; residents felt Balint groups built community, increased insight about patient care, and promoted reflective practice	Volunteer participants may increase selection bias; small sample; and no power calculation done
Ballon and Skinner, ²⁵ 2008	Academic university health center; PGY-1 psychiatry residents (N = 28)	Structural elements of addiction psychiatry rotation to support reflection (discussions, assignments, and dedicated time)	Does reflection influence development of empathy and professional attitudes for residents on an addiction psychiatry rotation?	Postrotation questionnaire assessed knowledge and attitudes about rotation as well as attitudes about the process of reflective journaling	Empathy, comfort with difficult material	Reflective discussion increased comfort with difficult content; participants were more comfortable providing negative feedback and critical feedback	No comparison group; responses not anonymous
Bernard et al, ¹⁸ 2014	Academic university health center; emergency medicine residents (n = 37) and faculty (n = 34)	Secure, free, web-based social media platform	Does a secure social media platform encourage sharing and discussion of reflection?	Reflections analyzed using constant comparison approach; survey data about satisfaction with tool analyzed using descriptive statistics	Professionalism; learning	Themes about reflection focused on clinical case management, challenges of work environment, expression of emotions, learning, and teamwork; varied participation but overall found reflection tool useful and informative	Voluntary, nonanonymous participation; short time frame for follow-up
Bethune and Brown, ¹⁹ 2007	Academic university health center; family medicine residency graduates (N = 8)	Case-based reflection exercises included in family medicine curriculum	How did using case-based reflection exercises impact trainees?	Semistructured interviews, coded for themes using crystallization and immersion	Professionalism; learning	3 major themes of the impact of reflective exercises: strategies for future learning in practice; different perspectives on patient-physician interactions; and reflection leading to personal insights	Retrospective, small sample (8 of total 57 residents who participated in the curriculum)
DasGupta et al, ²³ 2006	Academic university health center; PGY-2 pediatrics residents (n = 18) and community health workers (n = 16)	Monthly reading and discussion group with Dominican American community organization as part of community medicine rotation	Can participation in a reading and discussion group with community health workers increase residents' connection to the community?	Content and thematic analysis of residents' written reports of lessons learned on the rotation; focus groups with community health workers	Professionalism; cultural competency	Improved self-reported understanding of cultural diversity and medical culture by physicians; enhanced understanding of different perspectives reported by both community health workers and residents	Conclusions based on physician self-report and speculation about future attitudes and behaviors by physicians and community health workers

TABLE
Studies Examining the Impact of Educational Activities Involving Reflection on Residents and Fellows (continued)

Source, y	Setting and Participants	Intervention	Research Question(s)	Methods	Focus	Findings	Limitations
Epner and Baile, ¹² 2014	Academic university health center; first-year oncology fellows (N = 26)	Monthly, 1-hour sessions led by senior fellows using dramatic techniques, reflective writing, and Balint-type case discussion groups	Can the "difficult conversations" seminar improve fellows' communication skills?	Analysis of reflective writing exercises; midyear and postcourse surveys	Communication	Participants valued the curriculum and believe they acquired important skills; fellows valued reflective writing exercises and open discussion; most fellows acquired at least a conceptual understanding of key skills	Voluntary sample; anonymous responses with limited participation in surveys; selection bias
George et al., ¹⁵ 2013	Community hospital program; PGY-2 family medicine residents (N = 25)	Monthly goal-setting sessions with a junior faculty learning coach and use of web-based portfolio	Can a learning coach help residents develop self-directed learning skills using goal-setting and reflection?	Coaches rated learning goals; analysis of portfolio reflections; resident interviews	Learning; reflective capacity	Residents' goal setting improved from simpler to more complex goals and greater independence in goal setting; reflective ability improved	No control group; small sample; maturation effect could impact self-directed learning skills
Khanum, ¹⁶ 2013	Academic health center (Pakistan); obstetrics and gynecology residents (N = 24)	Residents participated in quarterly meetings and completed reflective exercises focused on learning challenges	Can reflective exercises improve learning of specific skills (surgical skills, professionalism, communication, and critical appraisal)?	Reflections scored using a rubric assessing reflective capacity	Reflective capacity	Wide variation in reflective capacity that improved over subsequent quarters; surgical skill reflections received the best reflection scores from the outset of the study	Rubric for scoring reflections not validated; small sample
Kung et al., ² 2015	Academic university health center; radiology residents (N = 30)	Curriculum of 6 radiology-specific, case-based sessions designed to foster professionalism and ethical behavior	Do case-based reflective sessions in radiology improve the professional skills of residents?	Pre-/posttest comparison of self-reported professionalism scores	Professionalism	No significance between pre- and posttest overall; specific questions had significant changes in areas of accountability, honor, integrity, enrichment, and duty; residents agreed with statements about the positive impact and utility of sessions	Results only significant when individual question items were analyzed separately

TABLE
Studies Examining the Impact of Educational Activities Involving Reflection on Residents and Fellows (continued)

Source, y	Setting and Participants	Intervention	Research Question(s)	Methods	Focus	Findings	Limitations
Learman et al, ²⁴ 2008	Academic university health center; obstetrics and gynecology residents (N = 32)	Residents completed 6 case reflection exercises selected from their experience, focused on ACGME competencies	Are faculty ratings of reflective exercises reliable? Does depth of reflection correlate with higher performance in specific competencies?	Reflection exercises scored for depth of reflection; interrater reliability and internal consistency calculated; reflection scores correlated to other competency assessments	Learning; communication skills	Low reflection scores suggested superficial reflection; low internal consistency for ratings, worst in systems-based practice; reflection scores correlated with medical student and allied health professional assessments of communication and professionalism; smaller correlation with peer assessment, no correlation with medical knowledge	Low internal consistency ratings across all exercises make findings of correlations with other assessments difficult to interpret, but 5 of the 6 exercises had adequate internal consistency
Levine et al, ¹⁷ 2008	9 internal medicine programs in different settings; PGY-1 residents (N = 32)	Interns volunteered to participate in narrative project over e-mail; submitting writing every 8 wk and a summary project	Does prompted narrative writing increase reflection or impact attitudes and behaviors of residents?	Analysis of writing by identifying meaningful segments, and looking for evidence of increased reflection	Reflective capacity; learning; professionalism	Engaging in writing process throughout the year encouraged deepening of reflection and reconsidering core values and priorities; for some, it improved self-awareness and provided an emotional outlet, motivated them to improve	Very small volunteer sample; findings not generalizable
Maurer et al, ²¹ 2006	Academic university health center; internal medicine (n = 52) and psychiatry (n = 8) residents	Columbia Cooperative Aging Program: includes narrative medicine, personal patient stories, and reflection on individual beliefs and understanding of the health of older adults	Does a geriatric rotation that includes reflective activities improve knowledge, skills, and attitudes about geriatric care?	Pre-/posttest evaluation of knowledge, attitudes, and skills related to geriatric care	Geriatric care; professionalism	Positive changes in knowledge, skills, and attitudes seen	Cannot separate reflective activities from other clinical material in the rotation; no comparison to group without reflective activities
Miller Juve, ³ 2012	3 anesthesia training programs at hospitals in the United States; PGY-2 and higher residents (N = 51)	Weekly reflective exercises using Gibbs 6-step framework for reflecting on experience over an 8-wk period	Does participation in reflective exercises increase readiness for self-directed learning for retaining medical knowledge?	Pre-/posttest assessment of readiness for self-directed learning; follow-up survey about impact on future engagement in reflective practice	Learning; reflective capacity	Participation in exercise did not affect readiness for self-directed learning; responses indicated plans to engage in reflective practice in the future; residents indicated belief that participation in reflective practice would have positive impact on patient care	Reflection occurred independently without discussion; voluntary sample using self-report of learning

TABLE
Studies Examining the Impact of Educational Activities Involving Reflection on Residents and Fellows (continued)

Source, y	Setting and Participants	Intervention	Research Question(s)	Methods	Focus	Findings	Limitations
Nothnagle et al, ²² 2014	Community hospital program; family residents (N = 22)	Family medicine forum: group reflection on self-directed learning curriculum and professional formation	Do interactive seminars on relevant issues with faculty present promote professional identity formation?	Thematic analysis of semistructured interviews with participants; field notes by anthropologist	Professionalism; community of practice	Residents felt sessions augmented practical professionalism skills and built community, fostering deeper connections to each other; noticed importance of reflection, role modeling, and impact on hidden curriculum	Cannot separate reflective activities from other material in the rotation; no comparison to group without reflective activities
Toy et al, ²⁰ 2009	Community hospital program; obstetrics and gynecology residents (N = 16)	Residents received lecture on reflective practice followed by monthly reflections on rotation goals and objectives as well as personal goal-setting	What is the impact of regularly spaced reflections on perceived clarity and achievement of rotation goals and objectives?	Procedure logging numbers before and after reflection; curriculum compared; residents completed survey regarding goal setting	Learning	Residents found reflection process acceptable, appreciated having time to think and share stressful experiences; increased number of documented cases in operative log while residents participated in reflection exercises	Small sample; however, comparison group was included
Winkel et al, ⁶ 2010	Academic university hospital; obstetrics and gynecology residents (N = 18)	6 narrative medicine seminars using reflective writing introduced into didactic curriculum	Is a reflective writing curriculum feasible in obstetrics and gynecology residency? Does participation improve burnout or empathy?	Pre-/posttest surveys regarding burnout and empathy; subjective questionnaire about experience	Burnout; empathy	Curriculum enjoyable, feasible, and acceptable, but residents did not believe that the sessions had an impact on their interactions with patients; no significant trends in burnout or empathy seen in participants	Study not powered to detect moderate difference in progression of burnout and empathy

Abbreviations: PGY, postgraduate year; ACGME, Accreditation Council for Graduate Medical Education.

In the study by Ballon and Skinner²⁵ psychiatry residents on an addiction rotation used reflective journaling to explore stereotypes and stigmas regarding addictive disorders. Participants reported feeling more comfortable and effective in engaging with patients after the rotation.

An Epner and Baile¹² study of a “difficult conversations” seminar series for oncology fellows revealed increased fellow skills in handling complex and difficult communication contexts.

The small number of studies in this area offered limited support for reflection as a means of exploring challenging content with physicians in training. The findings suggest reflection creates a forum where these difficult subjects can be safely explored, increasing comfort and readiness when these issues are encountered in clinical practice.

Discussion

The opportunity to learn through reflection has potential in GME, with a limited number of heterogeneous studies suggesting reflection as a teaching tool for several key teaching topics and contexts. Collectively, the 16 studies suggested reflection has a positive impact on empathy, increases comfort with learning in complex situations, and enhances engagement in the learning process. Reflection also appears to enhance learning of complex subjects, deepen professional values, and improve attitudes and comfort when learners explore difficult subjects.

Established models of reflection propose that personal growth occurs over time, as experiences are examined to produce new understanding that informs future practice. In addition to this horizontal dimension of reflection, there appears to be a vertical dimension, in which superficial reflective capacity can expand into deeper reflection with critical synthesis.¹ Studies included offered some evidence that this vertical reflective capacity may develop with practice. However, most studies did not include comparison groups, and natural maturation may have been a confounder.

Studies that looked at the role of reflection in enhancing residents’ learning found that graduates who received instruction in reflection continued to engage in reflective practice after training. This is consistent with Schön’s reflective practice¹ and Moon’s concept that reflection is the path from superficial to deep learning.¹

Studies that examined the impact of reflection on professionalism did not show changes after reflection, but participants reported changes in their beliefs. Changes may have occurred, but they were not detected with the available measures. Studies that

used reflection in a community of practice suggested it as a possible antidote to the “hidden curriculum” that can undermine professional values in the learning environment.

Theoretical links between reflection and empathy are based on physicians’ willingness to self-assess, coupled with their ability to accurately read patient cues.²⁷ Studies in this area found participants had positive perceptions of the impact of reflection on their attitudes and communication skills, but there was no difference in measured empathy or communication skills.

Limitations of this review include the small number of original studies, lack of comparison groups, reliance on self-reporting, and use of instruments that lack validity evidence. Most notably, studies in the review did not measure the impact of reflection on professional behaviors, resident learning, or patient outcomes. Most used volunteers, which may limit generalizability to settings where learners are required to participate in reflection.

In addition, the review itself may have inadvertently excluded studies, which might have altered the conclusions. Finally, providing formal opportunities for reflection in clinical education may influence physician wellness—an important issue facing educators—but to date no studies have addressed this topic.

Future research could assess contexts that promote reflection, and the value and outcomes of engaging learners not naturally drawn to reflection is a critical topic for future study.

Conclusion

Reflection offers the potential to enhance and deepen learning, empathy, and professionalism in residents and fellows. This systematic review revealed a small body of relevant literature that supports reflection as a habit that can be developed, a tool that can clarify professional values and build community, and a way to help learners process complex subject matter. In contrast, the influence of reflection in developing empathy and communication skills was not clear in the studies reviewed.

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