BMJ Open

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Journal:	*BMJ Open*
Manuscript ID	bmjopen-2019-031568
Article Type:	Research
Date Submitted by the Author:	09-May-2019
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Keywords:	MEDICAL EDUCATION & TRAINING, MEDICAL ETHICS, EDUCATION & TRAINING (see Medical Education & Training)

Content and Outcomes of Narrative Medicine Programs:

A Systematic Review of the Literature through 2017

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Article Word Count

4,603 words

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Abstract

Objectives

Narrative Medicine incorporates stories into health sciences paradigms as fundamental aspects of the human experience. The aim of this systematic review is to document objectives, content, and evaluation outcomes of narrative medicine programs implemented in academic medicine and health sciences with the goal of providing recommendations regarding best practices for future narrative-based education.

Methods

The authors conducted a systematic review of literature published through 2017. Eligible programming included textual analysis/close reading of published literature and creative/reflective writing. Qualifying participants comprised individuals from health sciences disciplines at varying levels. The authors reviewed and categorized program goals, content, and evaluation activities.

Results

Of 1,712 identified records, 45 records (40 unique programs) were included. The authors documented program scope and evaluation design/methods to assess participant satisfaction and program efficacy. Evaluation methods lacked consistency, with only 75% (n=30) of programs reporting any form of evaluation. Some programs lacked thorough evaluations descriptions. Quantitative and qualitative evaluations deemed as well described assessed participant satisfaction and various competencies. Fifteen programs used

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quantitative evaluation (7 well described), whereas 26 programs used qualitative evaluation (22 well described). Well-described quantitative evaluations relied on 20 different measures (7 validated) and showed evidence of high participant satisfaction and pre-post improvement in empathy, perspective-taking/reflection, resilience and burnout detection/mitigation, confidence/personal accomplishment, relevance to work, and pedagogical skills. A median of 90.5% of participants agreed or strongly agreed that the program had positive outcomes. Qualitative evaluation identified high participant satisfaction and improvement in relationship-building, empathy, perspective-taking/reflection, resilience and burnout detection/mitigation, confidence and personal accomplishment, narrative competence, relevance to work, pedagogical skills, ethical inquiry, cultural competence, and institutional impact.

Conclusion

Evaluation suggests that narrative medicine programming leads to high participant satisfaction and positive outcomes across various competencies. The authors suggest best practices and innovative future directions for the implementation and evaluation of narrative medicine programs.

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Article Summary

Strengths and Limitations of this Study

- The inclusion criteria based record eligibility upon the scope, participants, and educational activities of narrative medicine programming implemented within academic health sciences worldwide through 2017.
- The research strategy involved creating and executing optimized searches of five major electronic databases—PubMed, Embase, PsycINFO, ERIC, and MedEdPORTAL—and generated 1,264 records after the removal of duplicates.
- Data analysis was accomplished through independent screening by members of the research team, resulting in the selection of forty programs for inclusion in the systematic review.
- Program information related to scope, participants, educational activities, and evaluation design/methods was thematically coded to facilitate data analysis; some degree of subjectivity was inevitable due to the complexities inherent to synthesizing mixed data from educational evaluations utilizing varying methodologies.
- Evaluation designs and methods were examined for rigor and well-described quantitative and qualitative outcomes were investigated to examine participant satisfaction and learning, with qualitative studies highlighting a more nuanced breadth of outcomes regarding personal and professional benefits for participants.

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Introduction

Narrative medicine (**NM**) is a framework for medicine and health sciences that values individuals' stories and experiences as integral aspects of the lived experience of health and illness. Historically, the fields of knowledge associated with medicine/science and narrative/humanities were more integrated until about the nineteenth century.[1] Likewise, the proliferation of specialization within medicine is a relatively modern conceptualization that has necessitated advanced technical training, leaving less space in educational curricula for the cultivation of humanistic disciplines.[2] Significantly, whereas the recommendations of the 1910 Flexner Report[3] pertaining to science-focused pre-medical and medical curricula reform have been heeded, its implications related to the importance of broader, humanities-focused training for aspiring physicians have gone largely neglected.[4,5] However, with the rapid evolution of twentieth-century medical technology, educational paradigms must shift to prepare well-rounded clinical and research professionals.[4,6,7] In contemporary healthcare models, which sometimes fail to deliver holistic, patient-centered care, the core tenets of NM have emerged as a means of enhancing clinical care and promoting wellness.

Scholarly discussion of literature and medicine surfaced in academic literature in the 1970s.[8] By 1995, one third of American medical schools had incorporated literature courses into their curricula.[9] Rita Charon introduced the term *narrative medicine* into the medical lexicon in 2001.[8,10,11] NM continues to evolve as a framework for healthcare based on Charon's assertion that: "The effective practice of medicine requires narrative competence, that is, the ability to acknowledge, absorb, interpret, and act on the stories and

plights of others. Medicine practiced with narrative competence, called *narrative medicine*, is proposed as a model for humane and effective medical practice."[11]

The integration of narrative and medicine offers benefits to healthcare providers as well as to patients, since the NM framework draws upon literature's unique ability to augment clinical competencies, enhance the moral imagination, and foster interpersonal understanding.[9,12] Narrative-based education shows promise for promoting communication,[13] cultural competence,[14] empathy,[15-17] and professionalism,[18] as well as for enhancing vitality and mitigating burnout.[19-21] To reap the benefits associated with NM, many academic medical institutions have implemented humanities-based educational initiatives into the curricula.[22] Most NM programs utilize a combination of activities, including reading literary narratives, participating in group discussion, engaging in writing exercises, workshopping peer narratives, interviewing patients, and creating portfolios.

To date, however, few studies exist that examine and interpret efficacy trends in NM programming as a whole, nor does the current literature assess overarching unmet needs. We report a systematic review of the objectives, contents, and evaluation outcomes of existing NM programs as a means of answering the research question: how effective is the implementation and evaluation of NM programs in academic medicine and health sciences? We also provide best-practice recommendations and new directions for future narrative-based programming.

Three prior systematic reviews have considered specific aspects of NM. Barber and Moreno-Leguizamon examined whether NM education fosters compassionate care for

adult patients.[23] Chen and Forbes concluded that reflective writing—one component of NM—may enhance empathy in medical students and thus could warrant inclusion in medical school curricula.[24] Fioretti et al. focused on the experience of patients and their caregivers through a lens of NM and indicated a need for clarity and specificity in NM research protocols.[25]

To our knowledge, no systematic review has addressed the overall effectiveness of NM programs offered to healthcare professionals and implemented in academic health sciences centers, including medical schools and hospitals. We sought to identify areas in which innovative NM programming may meet existing needs for both clinicians and biomedical researchers at all career stages, including students, residents, clinical and research fellows, and faculty. In addition, we identified areas for improvement in the reporting of the design and evaluation of NM programs.

Methods

Criteria for selecting studies for this review

To be eligible for inclusion in the systematic review, a record had to document NM programming implemented within academic health sciences. We excluded articles, abstracts, commentary, or perspective pieces focused exclusively on NM theory.

Record eligibility also was contingent on the constituencies to which NM programming was offered. We considered a broad target audience consisting of one or more of the following: 1) graduate medical, dental, or health sciences students, including candidates for

MD, DMD, PhD, MS, and MPH degrees; 2) undergraduate or graduate nursing and allied health students; 3) medical, dental, nursing, or health sciences trainees, including residents, clinical fellows, and research fellows; 4) nurses; 5) allied health professionals; 6) faculty in the medical, dental, and health sciences; and 7) non-faculty physicians.

A third inclusion criterion involved the educational components of NM training. The history of literature and medicine is grounded in both literary analysis and narrative writing,[9] although some scholars consider reflective/creative writing to be a relatively recent addition to NM programming.[8] Nevertheless, writing is a singularly effective means of fostering reflection.[26] Therefore, we specified that, to be eligible for the systematic review, NM trainings had to include **both** essential components of NM imbedded in the programmatic core: 1) textual analysis/close reading of published literature (e.g. poetry, fiction, creative non-fiction) and 2) creative/reflective writing.

Search methods for identification of studies

We consulted the Boston University School of Medicine Assistant Director of Library and Information Management Education to design a search strategy for the systematic review. Our information sources included five major databases: PubMed, Embase, PsycINFO, ERIC, and MedEdPORTAL. PubMed—an online repository of the US National Library of Medicine, National Institutes of Health—is home to over 29 million citations in the realm of biomedical literature. Likewise, Embase indexes significant biomedical literature from across the globe. PsycINFO, the expansive database of the American Psychological Association, focuses on up-to-date behavioral and social science research. ERIC represents

the U.S. Department of Education's Institute of Education Sciences online research library. MedEdPORTAL is a database of program curricula provided by the Association of American Medical Colleges. Strategies were optimized for each database to make the best use of that resource's specific Controlled Vocabulary or preferred search syntax. This is a best practice endorsed by and documented in the *Cochrane Handbook for Systematic Reviews for Interventions*.[27] The databases were searched in their entirety through the end of 2017. A table documenting our electronic search strategy is presented in **Supplemental Digital Appendix 1**.

Data collection and analysis

We assessed the records identified during the literature search using a two-round, iterative process to reach consensus on eligibility (**Figure 1**),[28] independently screening the 1,264 record abstracts after the removal of duplicates. If an abstract was unavailable, the article text was consulted when possible. To be considered eligible, records had to meet all inclusion criteria. Based on the first round of screening, 125 records qualified for full-text assessment.

During the second screening stage, we read the full texts of records, identifying a further 80 records to exclude due to our discovering upon full text review that they did not meet our established eligibility criteria (**Figure 1**). Following the full-text screening, 45 records qualified for review.[14,21,29-69] However, we discovered that several qualifying records addressed identical NM programming efforts at the same institution: that is, 10 records [14,21,37,38,40-44,66] represented 5 programs. We considered programs represented by more than

one publication type together, thus resulting in 40 unique NM programs being included in the systematic review.

We performed the data collection independently, analyzing the 40 eligible programs to identify significant information and classifying relevant data for assessing the overall effectiveness of NM in academic medical centers. We then cross-checked our results for reliability. Initially, we extracted verbatim data according to date(s) of publication; institution type; geographic location; participant information; program goals, scope, and activities; evaluation methods (**Table 1**); well-described evaluation outcomes (**Table 2, Supplemental Digital Appendix 2**); and evaluation competencies (**Table 3**). We coded and synthesized the verbatim data regarding program context, design, goals, and evaluation according to broad themes (**Supplemental Digital Appendix 3)**.

Since we were particularly interested in identifying the outcomes, as well as the curricular content and goals of NM education, we paid special attention to categorizing evaluation methodology used for assessing program evaluations. We classified programs according to whether or not they were evaluated, and then differentiated the evaluated programs according to evaluation design and method. We stratified program evaluation based on the type of methods used (qualitative versus quantitative), the thoroughness of the description of the evaluation, including whether the methods and analysis strategy were discussed, and results reported.

In regards to evaluation design, programs were categorized as: 1) cross-sectional, including all programs with post-program evaluation without a comparator; 2) controlled or

uncontrolled pre-post test, including all programs that included both a pre-test and a post-test; and 3) randomized step-wedge design, including all programs that used a step-wedge design to examine program impact on participants randomized to participate at different time points. We were open to including other evaluation designs, but only the three designs discussed here emerged from our analysis of the NM programs included in the systematic review.

In addition to tracking overall evaluation strategies, we used grounded analysis to analyze the extracted data. Hence, program goals did not necessarily map neatly onto actual outcomes. We recorded the well-described evaluation of specific NM-related competencies according to the following thematic groupings: participant satisfaction, relationship-building, empathy, perspective-taking and reflection, resilience and burnout detection/mitigation, confidence/personal accomplishment, narrative competence, relevance to work, pedagogical skills, ethical inquiry, cultural competence, and institutional impact. Attentive listening practices are included in the relationship building and narrative competence thematic groupings.

Results

Descriptive Statistics

Table 1 summarizes the descriptive statistics of all 40 programs included in our review. The programs included in our review were documented and disseminated through a variety of media, including articles (n=25), abstracts (n=13), *MedEdPORTAL* curricula (n=4),

unpublished theses (n=2), and a book chapter (n=1). Publication dates were from 2005 to 2017, with the median year of publication being 2014.

NM programming efforts reported in the literature were concentrated in relatively high-resource settings. The bulk of trainings occurred in North America (n=32, 80.0%), followed by Europe (n=5, 12.5%), Asia (n=2, 5.0%), and South America (n=1, 2.5%). See **Supplemental Digital Appendix 4** for a map of NM program locations.

NM program participants and size varied. Programming was offered for medical students (n=19, 47.5%), faculty and non-faculty physicians (n=15, 37.5%), resident and fellow clinical trainees (n=13, 32.5%), other staff (n=7, 17.5%), nurses and nursing students (n=6, 15%), and other students (n=2, 5.0%). Some programs were open to more than one of the above constituencies. Numbers of participants ranged from 5 to 350 individuals (median, 26; Q1-Q3, 13-48); for 10 programs, participant constituency, and/or numbers were not provided.

The number of sessions offered by NM programs was highly heterogeneous, running the gamut from a single workshop or seminar to as many as 40 half-hour sessions offered over the course of a year.[48] The median number of sessions offered was 4 (Q1-Q3: 3-9). The number of hours of programming offered was similarly highly variable, ranging from 1 to 60, with 9 being the median (Q1-Q3: 3-20).

NM programs specified one or several educational objectives related to both narrative and clinical/medical skills. We grouped programmatic goals involving narrative skills into several categories, including the cultivation of reflection (n=17, 42.5%); communication,

attentive listening, and narrative competence (n=15, 37.5%); empathy (n=13, 32.5%); resilience and burnout detection and/or reduction (n=7, 17.5%); cultural competence (n=3, 7.5%); wellness (n=3, 7.5%); narrative skills for pedagogy (n=2, 5%); and writing (n=2, 5%). Programmatic goals related to clinical/medical skills sought to employ NM to foster clinical competence (n=13, 32.5%); enhanced sense of professionalism and vocation (n=11, 27.5%); and successful medical team functioning (n=5, 12.5%).

In order to achieve the stated programming goals, NM curricula relied on a combination of activities, including group discussion, typically based on literary readings (n=34, 85.0%); writing exercises (n=32, 80%); sharing and/or workshopping participants' writing (n=25, 62.5%); reading together as a group (n=23, 57.5%); and other narrative-based exercises (n=15, 37.5%), such as conducting patient interviews and writing patients' stories, creating portfolios, participating in an online forum, and even—in two instances—presenting a play.

NM Program Evaluation

The reporting of NM program evaluations varied across programs and publication types. Ten programs did not report any evaluation activities. For programs reporting quantitative evaluations, we identified seven as well described and eight that reported some quantitative methods but were not thoroughly described. Programs were deemed as "not well described" if they did not include full details regarding evaluation methods. See **Table 2** for explanations for programs deemed as well defined; incomplete quantitative and qualitative program evaluations are recorded in **Supplemental Digital Appendix 5**. For

programs reporting qualitative evaluations, we identified 22 as well described and four that were not described thoroughly. Only three NM programs were deemed as having both quantitative and qualitative evaluation methods that were well described.[45,47,51]

Evaluation designs varied across NM programs and included the use of cross-sectional designs, pre-post designs, and randomized step-wedge designs. Of the evaluations we identified as well described, twenty-five evaluations used a cross-sectional design with a post-test only. Of the evaluations utilizing a cross-sectional design, most had only an immediate post-test (n=22), one had an immediate post-test and a long-term post-test (1.5 years later),[29] and one had a long-term post-test only (1.5 year).[70] One evaluation did not report the timing of the post-test.[48] Of the three evaluations that used a pre-post design, two did a pre-test and immediate post-test, and one did a pre-test and long-term post-test (1 year).[21,66] One evaluation used a randomized step-wedge design in which participants were randomized into two groups, and the groups participated in the program at different times.[37,38] Post-tests of program participants were compared to pre-tests of those who had not yet participated in the program.

Overall, the evaluations demonstrated that NM programming can have a variety of positive impacts on healthcare providers (**Tables 2 and 3**). Quantitative evaluations provide evidence for modest gains in areas related to pedagogy, empathy, and perspective-taking; whereas qualitative evaluations identified gains related to confidence, relevance of work, institutional impact, pedagogy, relationship-building, perspective-taking and reflection, resilience and burnout detection or mitigation, narrative competence, cultural competence, ethical inquiry, and increased sense of personal accomplishment (**Tables 2 and 3**). In

addition to evaluating the impact of the program on participants, many evaluation strategies focused on evaluating participants' satisfaction of the program. NM satisfaction scores were reported to be high, with the combined percent agree or strongly agree to the satisfaction measures as 93.6% (our calculation). However, satisfaction outcomes were not necessarily indicative of subsequent changes in the behavior or experiences of health sciences professionals who engaged in the programming.

Of quantitative programs deemed as well described, four reported high satisfaction,[45,47,59,65] while modest and positive but not statistically significant impacts were reported on: pedagogical skills (n=1),[34] relevance to professional work (n=1),[59] resilience and burnout detection/mitigation (n=1) , and confidence/increased sense of personal accomplishment (n=2).[21,34,66] Programs that reported statistically significant programmatic impacts examined increased empathy (n=2),[21,51,66] and increased perspective-taking/reflection (n=1).[21,66]

Of qualitative programs deemed as well described, 8 reported high satisfaction,[37,38,40,41,54,65,67,68,71] while positive impacts were reported on: relationship-building (n=11),[14,33,35,36,39-42,45,48,61,69,70] empathy (n=7),[14,42,45,48,51,60,69,70] perspective-taking/reflection (n=5),[14,33,35,36,39,42,45,60,69,70] resilience and burnout detection/mitigation (n=4),[35,46,48,70] narrative competence (n=3),[37,38,40,41,45] confidence/personal accomplishment (n=2),[29,36] ethical inquiry (n=2)[45,60] relevance to work (n=1),[29] pedagogical skills (n=1),[33] cultural competence (n=1),[14,42] and institutional impact (n=1).[33] The qualitative studies highlighted a more nuanced breadth of outcomes regarding personal and professional benefits for participants in NM programs.

We observed that the stated goals of NM programs were not always reflective of the reported evaluation outcomes. Programs identified a variety of goals, but a striking number did not report actual evaluation results (n=9) [30,49,50,52,55-58,72] or only discussed general participant satisfaction (n=6).[47,54,65,67,68,73] We found the evaluation methods and outcomes of many programs to be insufficiently developed or described.

Discussion

Our review of 40 NM programs demonstrated modest but positive varied benefits related to narrative-based education for health science professionals, reflective of the remarkable diversity of the trainings implemented. From a geographical perspective, the bulk of programs took place in North America, followed by Europe. Audiences varied, but the highest concentration of programs were targeted at medical students, followed by trainees (residents and fellows), and then faculty and non-faculty physicians. Program goals encompassed a range of narrative and clinical skills. Program activities tended to concentrate on reading and discussion, as well as on reflective writing exercises.

Most evaluation designs utilized a cross-sectional, post-test only evaluation, which did not allow evaluators to understand the relative impact of the program. Only seven programs compared participants before and after the NM training, using either a pre-post or step-wedge design. Only four programs evaluated the long-term impact of the training, with post-program evaluations conducted between one month and one and a half years after program completion. The majority of programming was evaluated by qualitative, quantitative, or mixed methods for satisfaction and/or efficacy. Despite an emphasis on the

value of writing, no programs used an evaluation deemed to be well described to assess gains in writing competence/confidence, and a surprisingly high number (n=10, 25%) of NM programs provided no details regarding evaluation design or methodology.

Whereas previous systematic reviews have concluded that NM education may be beneficial in contributing to the delivery of compassionate care[23] and that reflective writing may help to enhance empathy in medical students,[24] our research builds upon the current literature to reveal a broad range of NM benefits. Our findings demonstrate that NM has shown potential for enhancing communication and team-building skills; encouraging perspective-taking and reflection; promoting empathic behavior; detecting/mitigating burnout; cultivating narrative competence; augmenting pedagogical skills, and fostering ethical inquiry.

Based on our analysis and interpretation of the programs reviewed, we recommend considering the inclusion of narrative-based education in curricula for medical/health sciences students, trainees, and faculty. We also suggest several best practices and new directions for future NM programming efforts as a means of increasing intervention efficacy and providing broader accessibility.

Recommended Best Practices and Future Directions for NM

Enhanced Program Evaluation Methods

Our research has noted that a substantial number of NM programs did not report any evaluation activities, while others only evaluated general participant satisfaction. Further,

in programs that were evaluated, evaluation design was highly variable, with the majority lacking assessment of long-term impact. Without carefully evaluating the short- and long-term outcomes of educational programming for gaining particular skills and competencies, it is difficult to continue assessing accurately whether NM programming addresses the unique needs of health sciences professionals in academic medicine and health sciences. Given the intense time constraints of the constituency, we submit that program evaluation is critical to ensure that time spent in a NM program is used effectively.

Quantifying the long-term impact of NM objectives, such as fostering empathy and ethical decision-making, is challenging—and certainly complicates the integration of NM training into continuing medical education curricula.[74] Nevertheless, education experts contend that medical ethics and humanities training, including narrative-based reasoning, is fundamental to the professional development of healthcare practitioners.[75] Ensuring the integration of relevant NM programming into educational curricula for the next generation of health sciences professionals requires strategic planning, thorough evaluation, and ongoing analysis. We have constructed a basic checklist for developing, implementing, evaluating, and disseminating a NM training, regardless of individualized program focus (**Supplemental Digital Appendix 6**).

Focus on Narrative Writing Skills

Narrative writing has the potential to leverage storytelling as an aspect of personal and professional growth. The literature supports that faculty writing groups and workshops can promote publications and presentations,[76-78] improve writing skills,[77,79] and bolster

confidence in writing.[77,78,80] However, we identified only one NM intervention that reported the development of writing skills as a program goal,[30] rather than the use of writing as a means towards achieving other stated outcomes, such as the cultivation of reflection or empathy skills. While no program reported evaluation of writing-related competencies in a manner deemed well-described, two programs reported that participants valued the opportunity to improve writing skills[54] and augment self-efficacy in writing/leading writing exercises.[34]

NM programming that includes training in writing competencies and self-efficacy represents an innovative educational model for accomplishing both the traditional goals of NM—e.g. empathy, communication, professionalism, resilience—and the additional outcome of fostering writing competencies. We recommend expanding future NM program objectives to include the development of enhanced writing skills and self-efficacy related to the writing process as measurable learning outcomes. Such a goal may be accomplished through a blend of expert-led instruction in literary theory, close reading of published literary texts, and workshopping of peer narratives, with the goal of coaching faculty to generate perspective pieces, advocacy narratives, creative writing projects, and educational texts for submission to peer-reviewed journals.

NM for Scientists

To date, a dearth of research exists regarding the occurrence and effectiveness of NM programming for scientists, and we submit that this knowledge gap should be addressed by the implementation and evaluation of narrative-based education for this constituency. The

NM programs analyzed in the current review were overwhelmingly geared toward clinical professionals, including physicians, nurses, clinical fellows, residents, medical students, and clinically-oriented staff. However, many of the programs' positive outcomes may be equally valuable for research faculty, postdoctoral fellows, and graduate students in the health sciences, who may benefit from narrative-based training to enhance communication and relationship-building skills, writing and teaching competencies, cross-cultural awareness, understanding of ethical inquiry and behavior, cross-disciplinary understanding, and professional identity formation.

While much attention has been given to clinician stress and burnout, NM also may prove beneficial for researchers navigating the stressors of a historically challenging funding climate. The inclusion of both clinical and research-focused professionals in NM programming has potential to foster interdisciplinary understanding, build affinity, and offer collaborative opportunities to groups who tend to operate in silos.

NM for Detecting and Mitigating Burnout

Given current concerns surrounding stress and burnout among professionals in medicine and health sciences[81-86] a need exists to identify and implement sustainable programming for cultivating resilience. Six programs evaluated the impact of NM education on resilience and burnout detection and/or mitigation.[21,35,46,48,66,70] While in one case quantitative evaluations of burnout after an NM training did not demonstrate statistical significance,[67] other programs suggested positive results regarding the use of NM for burnout identification and reduction.

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Although NM programs offer a promising initial step towards employing narrative-based education for resilience, additional research is needed to demonstrate the potential impact of NM education on physician and scientist wellness, particularly in specialties and contexts with high burnout rates. While preliminary studies have explored how narrative practice and reflective practice may be an effective intervention for front-line medical responders working in the burnout-prone context of international humanitarian frameworks,[87,88] reports on research, development, and implementation of NM programming for such constituencies are scarce. Therefore, we suggest further development and evaluation of narrative-based education focused on burnout detection and mitigation—with the potential for adapting successful NM programming to burnout-prone health care contexts beyond academic medicine, including among humanitarian and military front-line medical providers.

NM for Cultural Competence

Several programs included in our review expressed increased cultural competence, communication and/or sensitivity as primary or secondary goals.[14,42,54,60,62] Given the power of literature for developing empathy[89] and expanding the moral imagination,[9] it is probable that NM programming could serve a unique role in fostering cultural sensitivity and illuminating unconscious bias, particularly since literature has been posited as a powerful vehicle for exploring themes of racial justice within medicine.[90] We therefore recommend additional research into NM education as a vehicle for promoting cultural competence,[91] which might be accomplished in a variety of ways, including by imbedding

narrative-based learning modules into unconscious bias trainings already taking place within academic health sciences.

NM for Low-Resource Settings

From a global perspective, NM programming efforts to date have been based primarily in high-resourced medical areas. There are opportunities for educational partnerships among institutions located in disparate geographic and socioeconomic settings both within the United States and abroad. Certainly the appearance of NM programming worldwide demonstrates a burgeoning global interest in the field, with 20.0% of training having been implemented outside the United States in recent years: Nepal in 2009,[63] the United Kingdom in 2010,[39] Canada and Chile in 2012,[37,38,65] France in 2013,[47] Italy in 2014,[61] Germany and Portugal in 2016,[57,68] and Iran in 2017.[69]

The increasing interest in NM education on a global level, including in some lower-resource settings, offers potential for development of scalable curricula that can be shared with resource-limited locations where humanities and medicine training curricula may still be scarce, as was reported to be the case in Nepal.[63] One potential strategy for implementing NM programming in lower-resource settings would be to create curricula for blended online and in-person educational modules. This type of program could leverage videoconferencing technology to connect first-time course implementers with more experienced facilitators located in higher-resource settings, allowing for peer mentoring using NM as both a healthcare framework and an educational tool.

Limitations

We acknowledge several limitations to our systematic review. First, thirteen (29%) qualifying records were abstracts, which by nature provide far less information than articles, curricula, unpublished theses, or book chapters. Second, our results are inevitably subject to potential publication bias, since programs with positive results are more likely to have been submitted and selected for publication. While the NM records made little mention of negative or neutral aspects of NM programming, such factors undoubtedly exist, including institutional funding limitations, faculty unfamiliarity, and participant time constraints. Furthermore, we noted the stated definition of NM to be inconsistent even within publications/programs that met our inclusion criteria, a factor which may have led to some lack of consistency within reports of program objectives, evaluations, and outcomes.

We recognize the inevitable complexities and potential pitfalls of synthesizing mixed data from educational evaluations that have utilized varying methodologies.[92] In particular, given our reliance on qualitative analysis when synthesizing the data, there is inevitably some element of subjectivity involved in data reporting and interpretation. Although we have made a good faith effort in our work, we do recognize that a degree of subjectivity is inevitable.

Finally, while we have provided discussion regarding ways in which the general thematic schema of NM program effectiveness may be transferable to future educational efforts, we nevertheless are aware that it is unclear how transferable the results of any specific program

may be, since many dimensions influence the impact of NM programming, including the unique participants, facilitator, curriculum, and frequency/duration of sessions. To a great extent, however, this challenge supersedes NM and remains ubiquitous to medical education as a whole.

Conclusion

Despite being a relative newcomer to contemporary medical education, NM programs already have resulted in a range of positive outcomes for health sciences professionals, including enhancing narrative competence, communication, and empathy; detecting and mitigating burnout; fostering reflection with regard to professional identity formation; promoting team-building; and facilitating teaching competencies. There are doubtless institutional barriers to overcome in implementing NM programming, including obtaining sufficient institutional or outside funding, augmenting conceptual understanding with medical education committees regarding the positive outcomes of narrative-based education, and providing protected time for faculty/trainee participation in NM curricula. Nevertheless, NM education shows promise for addressing some of the most pressing concerns for today's health sciences professionals, including high suicide rates, depression, and burnout compounded with declining research funding, shorter patient visit times, mounting paperwork, and decreased job satisfaction. Such challenges necessitate innovative solutions—and NM may prove to be a highly resource-effective solution.

Implications for Research

We advise that NM programming best practices and future directions should include the

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use of robust evaluation mechanisms; inclusion of writing training as an additional learning outcome; and the development and implementation of NM for researchers, burnout-prone providers/contexts, cultural competence trainings, and lower-resource settings. We hope our systematic review helps to further the integration of narrative-based education into curricula at all levels in academic health sciences with a view toward nurturing resilient, reflective, and emotionally intelligent professionals who, in turn, will provide better patient care, health sciences education and research, and public health.

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Tables

Table 1: Descriptive Statistics of 40 Programs in Narrative Medicine Systematic Review

Publication Year	2014 [2011-2016][a]
Publication Type[b]	
Article	25 [c] (55.5)
Abstract	13 [c] (28.8)
Curriculum	4 [c] (8.8)
Unpublished Theses	2 (4.4)
Book Chapter	1 (2.2)
Program Location	
USA/Canada	32 (80.0)
Europe	5 (12.5)
South/Western Asia	2 (5.0)
South America	1 (2.5)
Number of Participants	26 [13-48]
Constituency[d]	
Medical Students	19 (47.5)
Faculty/Physician Non-Faculty	15 (37.5)
Residents/Fellows	13 (32.5)
Other staff (e.g. administrators, paramedical personnel, community workers)	7 (17.5)
Nurses/Nursing Students	6 (15.0)
Other students (e.g. graduate students)	2 (5.0)
Program Goals[d]	
Narrative Goals[d]	
Reflection	17 (42.5)
Communication/Attentive Listening/Narrative Competence	15 (37.5)
Empathy	13 (32.5)
Resilience/Burnout Detection/Mitigation	7 (17.5)
Cultural Competence	3 (7.5)
Wellness	3 (7.5)
Narrative Skills for Pedagogy	2 (5.0)
Writing	2 (5.0)
Clinical/Medical Skills[d]	
Clinical Competence	13 (32.5)
Professionalism and Vocation	11 (27.5)
Medical Team Functioning	5 (12.5)
Number of Sessions	4 [3-9]
Hours in Program	9 [3-20]
Program Activities[c]	
Group Discussion	34 (85.0)
Writing Exercises	32 (80.0)
Sharing Writing/Workshop	25 (62.5)
Group Reading	23 (57.5)
Other (e.g. interviews, observations, portfolios, writing a patient's story, online forum)	15 (37.5)
Program Evaluation Methods[e]	
Quantitative – Well Described	7 (17.5)
Quantitative – Incomplete Description	8 (20.0)
Qualitative – Well Described	22 (55.0)

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Qualitative—Incomplete Description	4 (10.0)
None/Not Specified	10 (25.0)

Data are median [Q1-Q3] or frequencies (%); [a]2 studies in the same year counted as one program; 2 studies in different years counted as two programs; [b]Percentages are calculated based on 45 records. [c]Program was represented by more than one publication type (e.g., article and curriculum);[d]Responses are not mutually exclusive, so percentages are over 100%; [e]11 studies used a mixed methods, with both qualitative and quantitative outcomes reported, so percentages are over 100%

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Table 2: Quantitative and Qualitative Well Described Evaluations of Narrative Medicine Programs in Systematic Review[a]

2A. Quantitative Evaluations – Well Described								
Reference	***New or Validated Outcome***	***Outcome***	***Outcomes– Thematic Grouping***	***N***	***Pre Mean (SD)***	***Post Mean (SD)***	***Mean Change (SD)***	***P Value***
Quantitative Studies Using Pre-post Test Design								
Bhavaraju VL, Miller S.[34]	New	Confidence in writing and leading writing exercises	• Confidence/ Personal Accomplishment • Pedagogical Skills	12	3.1	4.2	1.1	N.R.
	New	Confidence in leading literary discussions	• Confidence/ Personal Accomplishment • Pedagogical Skills	10	3.7	4.4	0.7	N.R.
	New	Integration of tools gained in training into teaching	• Pedagogical Skills	10	2.2	2.7	0.5	N.R.
Goupy F, *et al*.[47]	New	Interest of topic	• Satisfaction	41	N/A	1.84 (0.82)	N/A	N/A
	New	Satisfaction with choice of theme	• Satisfaction	41	N/A	2.13 (0.72)	N/A	N/A
	New	Satisfaction of discussion related to theme	• Satisfaction	41	N/A	2.30 (0.62)	N/A	N/A
Holub PG.[51]	Validated	JSPE – Control Group	• Empathy	41	119.10 (15.64)	116.15 (16.15)	- 2.95 (6.77)	0.001
	Validated	JSPE – Treatment Group		41	119.28 (9.05)	124.48 (8.47)	5.10 (7.20)	
Winkel AND Winkel	Validated	Maslach Burnout Inventory: Emotional Exhaustion	• Resilience and burnout detection/mitigation	43	N.R.	N.R.	- 2.0 (8.7)	0.12
	Validated	Maslach Burnout Inventory: Depersonalization	• Resilience and burnout detection/mitigation	43	N.R.	N.R.	0.1 (4.0)	0.61
	Validated	Maslach Burnout Inventory: Personal Accomplishment	• Personal accomplishment	43	N.R.	N.R.	1.2 (7.1)	0.70

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AF, *et al.*[21,66]	Validated	Interpersonal Reactivity: Empathic Concern	• Empathy	43	N.R.	N.R.	0.76 (5.9)	0.01
	Validated	Interpersonal Reactivity: Perspective Taking	• Perspective-taking/ Reflection	43	N.R.	N.R.	21.37 (7.8)	0.01

Quantitative Studies Using Post-test Design

Reference	***New or Validated Outcome***	***Outcome***	***Outcomes– Thematic Grouping***	***N***	***% agreement with outcome***
Goodrich TJ, *et al.*[45]	New	Usefulness of the training	• Satisfaction	48	79%
	New	Interest of the training	• Satisfaction	48	88%
Moss HA, *et al.*[59]	New	Satisfaction of training	• Satisfaction	27	99%
	New	Relevance of training to work	• Relevance to work	27	97%
Walker MR, *et al.*[65]	New	Total Satisfaction of course	• Satisfaction	32	89%
	New	Appropriateness of activities	• Satisfaction	32	94%
	New	Overall experience with instructors	• Satisfaction	32	97%

2B. Qualitative Evaluations – Well Described[b]

Reference	***Design***	***Timing***	***Methods***	***Outcome Improved – Thematic Grouping***
Arntfield SL, *et al.*[29]	Post-test	Immediate, 1.5 years later	Open-ended surveys; focus group	• Confidence/ Personal Accomplishment • Relevance to work
Balmer DF, Richards BF.[33]	Post-test	Immediate	Ethnography, content analysis, interviews	• Institutional impact • Pedagogical Skills • Relationship-building • Perspective-taking/Reflection
Birigwa SN, *et al.*[35]	Post-test	Immediate	Surveys	• Relationship-building • Resilience and burnout detection/mitigation • Perspective-taking/Reflection
Bobb SJ[36]	Post-test	Immediate	Ethnography, interviews	• Perspective- taking/Reflection • Relationship-building • Confidence/Personal accomplishment
Boudreau JD, *et al.* [37] *AND* Liben S, *et al.*[38]	Random-ized Step Wedge	Immediate	Interviews	• Narrative competence • Satisfaction
Brigley S, Jasper M[39]	Post-test	Immediate	Observation, focus groups, interviews	• Relationship-building • Perspective-taking/ Reflection

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Chretien KC, *et al.* [40] *AND* Chretien KC, *et al.*[41]	Post-test	Immediate	Focus groups, patient interviews	• Narrative competence, • Relationship-building, • Satisfaction
DasGupta S, *et al.* [42] *AND* Dasgupta S.[14]	Post-test	Immediate	Focus Groups, resident evaluations	• Cultural competence • Relationship-building • Empathy
Goodrich TJ, *et al.*[45]	Post-test	Immediate	Focus Group; program evaluation survey	• Empathy • Ethical inquiry • Narrative competence • Relationship-building
Gordon E.[46]	Post-test	Immediate	Content analysis of essays	• Resilience and burnout detection/mitigation
Goupy F, *et al.*[47]	Post-test	Immediate;	Open-ended survey	• Satisfaction
Gowda D, *et al.*[48]	Post-test	Not stated	Observation of sessions; interviews	• Relationship-building • Resilience and burnout detection/mitigation • Empathy
Holub PG.[51]	Post-test	Immediate	Focus Groups	• Empathy
Kennedy AJ, Sgro G. [54]	Post-test	Immediate	Open-ended survey	• Satisfaction
Murinson, B.[60]	Post-test	Immediate	Content analysis of responses	• Empathy • Ethical inquiry • Perspective-taking/Reflection
Polvani S, *et al.*[61]	Post-test	Immediate	Patient and family interviews; video recorded patient-doctor interactions, document review of letters of complaint	• Relationship-building
Small, *et al.* [70]	Post-test	1.5 year later	Interviews	• Relationship-building • Empathy • Resilience and burnout detection/mitigation
Spike J.[73]	Post-test	Immediate	Open-ended survey	• Satisfaction
Walker MR, *et al.*[65]	Post-test	Immediate	Open-ended survey	• Satisfaction
Winkel AF, *et al.*[67]	Post-test	Immediate	Questionnaire	• Satisfaction
Wohlmann A, Halstein M.[68]	Post-test	Immediate	Open-ended survey	• Satisfaction
Zohouri M.[69]	Post-test	Immediate	Content analysis of essays	• Empathy • Relationship-building • Perspective-taking/Reflection

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Notes: [a] All Quantitative Evaluations – Well Described report evaluation at the end of the program except for Winkel and Winkel AF.[21,66]. [b]See Appendix 2 for Outcomes/Findings.

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Table 3: Competencies Evaluated in Narrative Medicine Programs in Systematic Review[a]

Program Evaluation Outcomes	Quantitative, Well Described (n=7)	Qualitative, Well Described (n=21)
Participant Satisfaction	4	8
Relationship-building	0	11
Empathy	2	7
Perspective-taking/Reflection	1	5
Resilience & Burnout Detection/Mitigation	1	4
Confidence/ Personal Accomplishment	2	2
Narrative Competence	0	3
Relevance to Work	1	1
Pedagogical Skills	1	1
Ethical Inquiry	0	2
Cultural Competence	0	1
Institutional Impact	0	1

Notes: [a] Results of some evaluations were not well described, not mentioned, or not statistically significant. Thus, not all results in Appendix 2 are included in the descriptions of positive NM program outcomes discussed in the text of our review.

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Figure Legend

Figure 1. Record Search and Screening Process for Narrative Medicine Systematic Review, through 2017

PRISMA Checklist

Please see the attached PRISMA checklist.

Acknowledgements

Not applicable.

Authors' Contributions

Christy D. Di Frances, PhD, MA, Ellen Childs, PhD, John Carlo Pasco, MS, Ludovic Trinquart, PhD, David B. Flynn, MS(LIS), Sarah L. Wingerter, MD, Robina M. Bhasin, EdM, Lindsay B. Demers, PhD, MS, and Emelia J. Benjamin, MD, ScM have made substantial contributions to the manuscript materials as follows:

1. Engaging in the conceptualization and/or design of the work—or in the acquisition, analysis, and/or interpretation of data.
2. Drafting and/or critically revising the manuscript in regards to significant intellectual content.
3. Giving final approval to the version of the work submitted for publication.
4. Agreeing to be held accountable for all aspects of the work, including ensuring that any inquiries related to the accuracy and/or integrity of the work are appropriately investigated and resolved.

Competing Interests/COI Disclosures & Funding

The authors have no conflicts of interest in connection with this manuscript. This research was supported by the:

- National Institutes of Health (NIH) and the Food and Drug Administration (FDA) Center for Tobacco Products (CTP) Award Numbers P50HL120163 and U54HL120163
- NIH/NHLBI Award Numbers R01 HL128914, R01 HL092577, and R01 HL126136

- American Heart Association (AHA) Award Numbers 18SFRN34110082 and 18SFRN34150007
- Robert Wood Johnson Foundation: 'Studying mHealth technologies to help people improve their health and share their health information in real time with health care providers'
- Columbia University 2018-2019 Narrative Medicine Fellowship: 'Peer-led Narrative Medicine Workshops for First and Second Year Medical Students'($2,000 awarded to BU medical student John Carlo Pasco, co-author)

Data Sharing

Not applicable.

Patient Consent

Not applicable.

Patient and Public Involvement

Not applicable.

Ethical Approval

Not applicable.

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91. Saffran L. What Pauline Doesn't Know: Using Guided Fiction Writing to Educate Health Professionals about Cultural Competence. *J Med Humanit.* 2017.
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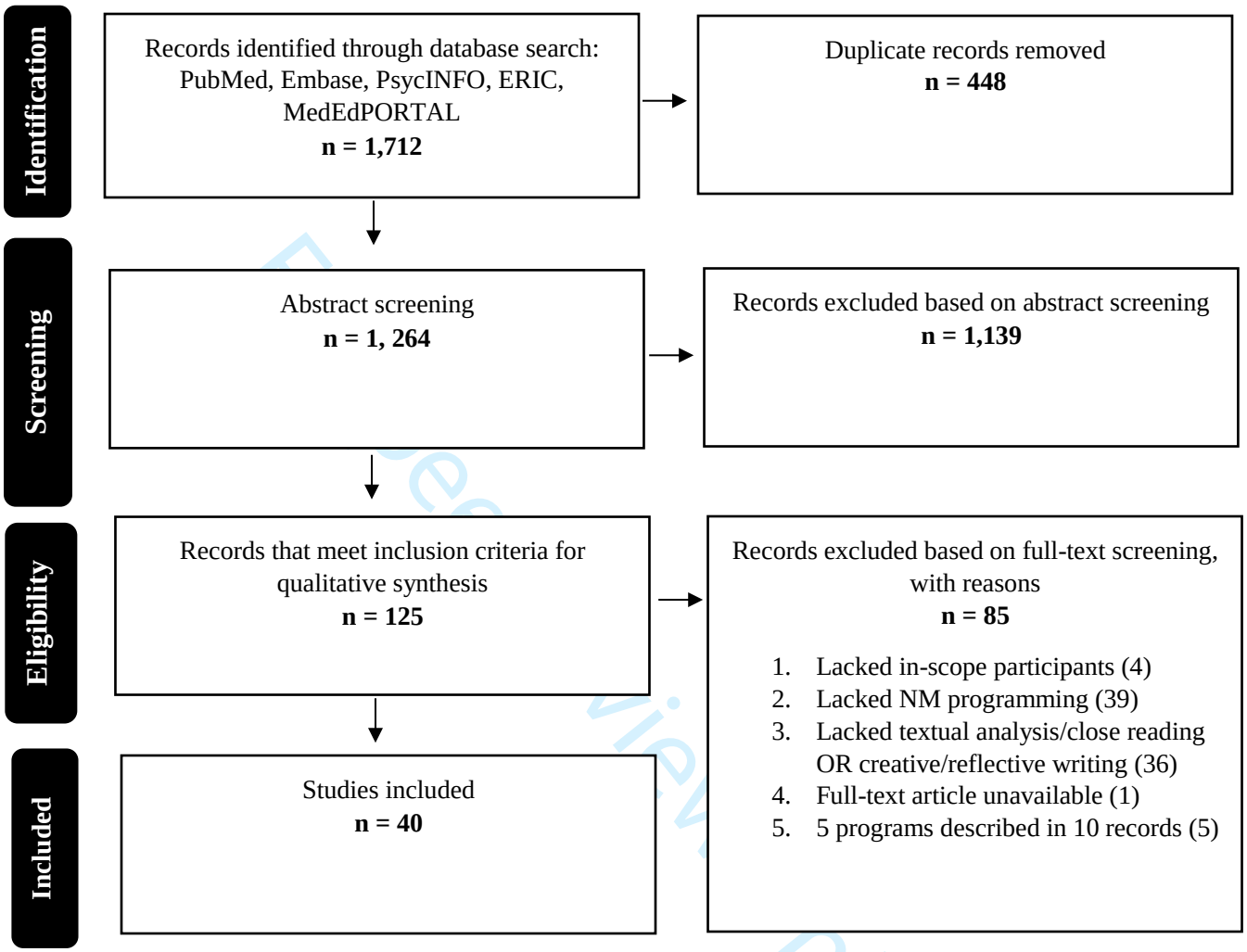
Figure 1. Record Search and Screening Process for Narrative Medicine Systematic Review, through 2017 [Mono Image]



Supplemental Digital Appendix 1. Literature Database Search for Narrative Medicine Systematic Review, through 2017

Database	Search Terms	Results	Duplicates	Original Citations
PubMed	"narrative medicine"[all fields] OR "reflective writing"[all fields]	456	4	452
Embase	"narrative medicine"/exp OR "narrative medicine" OR "reflective writing"	593	321	272
PsycINFO	TX narrative medicine OR TX reflective writing	497	107	390
ERIC	"narrative medicine"	13	6	7
MedEdPORTAL	"narrative"	98	1	97
MedEdPORTAL	"reflective"	55	9	46
TOTAL		1,712	448	**1,264**

Supplemental Digital Appendix 2. Outcomes/Findings for Qualitative – Well Described Evaluations (a Supplemental to Table 2B)

Reference	Outcomes/Findings	Outcome Improved – Thematic Grouping
Arntfield SL, *et al*.(1)	Confidence in effectiveness of future as physicians	• Confidence/ Personal Accomplishment • Relevance to work
Balmer DF, Richards BF.(2)	Qualitative themes that emerged: 1) Teaching skills and personal growth; 2) Impact on Interpersonal relationships; 3) impact on the institution	• Institutional impact • Pedagogical Skills • Relationship-building • Perspective-taking/Reflection
Birigwa SN, *et al*.(3)	"…NM workshops help with coping with stress, give time to relax and self-reflect, and increase positive physician/patient engagement."	• Relationship-building • Resilience and burnout detection/mitigation • Perspective-taking/Reflection
Bobb SJ(4)	"…Building stronger relationships as they grew more aware of each other's stories and had the opportunity to reflect on their work among their coworkers…. intensified individual and team understanding of their roles as healthcare professionals…this process positively contributed to their individual and shared identity, value, and meaning as a nurse."	• Perspective-taking/Reflection • Relationship-building • Confidence/Personal accomplishment
Boudreau JD, *et al*. (5) *AND* Liben S, *et al*.(6)	"The written comments were invariably supportive… The most prevalent specific recommendations revolved around ensuring that in future workshops everyone should be accorded the opportunity to share stories… A second cluster of recommendations had to do with the quality of the writing triggers" "…the majority of study participants already use a form of narrative in their teaching … those who attended displayed a more nuanced understanding of narrative as revealed by their (appropriate) use of specific narrative medicine descriptors."	• Narrative competence • Satisfaction
Brigley S, Jasper M(7)	"…improved educational understanding and multidisciplinary awareness among its participants. Refinements of the programme were identified…"	• Relationship-building • Perspective-taking/Reflection
Chretien KC, *et al*. (8) *AND* Chretien KC, *et al*.(9)	Qualitative analysis resulted in four themes: patient experience, student experience (and student learning), student-patient dynamic, and challenges. 'Students' stories showed attainment of narrative competence.'	• Narrative competence, • Relationship-building, • Satisfaction
DasGupta S, *et al*. (10) *AND* DasGupta S.(11)	"…all participants believed the activity helped them learn about the importance of recognizing cultural differences." "...the medical residents reported a variety of intentions to change their attitudes and behaviors including an intention to be more sensitive to cultural differences and more patient and to recognize their biases and the effect of those biases on caregiving."	• Cultural competence • Relationship-building • Empathy
Goodrich TJ, *et al*.(12)	Findings from the Focus Groups: 1) relevance of narratives in ethical decision making, 2) empathic connection that was achieved through narrative understanding as necessary for producing ethical behavior, 3) ways to nurture insights regarding contextualizing their patients. Findings from the program evaluations: 1) More holistic way of looking at patients (beyond just the illness), 2) recognition of how physicians' values enter into clinical decision making	• Empathy • Ethical inquiry • Narrative competence • Relationship-building

Reference	Outcomes/Findings	Outcome Improved – Thematic Grouping
Gordon E.(13)	"Of [the 39 essays analyzed], 13 (33%) contained statements concerning for burnout." The authors conclude that, "Narrative medicine can be a powerful tool for identifying signs of burnout among Internal Medicine residents. In addition, sharing of patient stories in groups can help trainees to reflect the commonality of challenging patient experiences, which might mitigate feelings of burnout."	• Resilience and burnout detection/mitigation
Goupy F, *et al*.(14)	Satisfaction with program	• Satisfaction
Gowda D, *et al*.(15)	"… team members across the disciplines and levels of educational attainment are open to active participation in sessions… team members speak of strengthening attention, valuing creativity, and enhancing relationships."	• Relationship-building • Resilience and burnout detection/mitigation Empathy
Holub PG.(16)	Confirmed quantitative findings that participants' rates of empathy was greater than non-participants.	Empathy
Kennedy AJ, Sgro G. (17)	Satisfaction with program; suggestions for improvement	Satisfaction
Murinson, B.(18)	"Qualitative analysis revealed that: emotional suffering, (e.g., isolation, heartache, etc.) is nearly universal for students at this stage, while physical pain is not; distinguishing physical pain from psychological or social suffering was initially difficult for some students, but the majority improved in this capacity; and that students were challenged to define their own values which served to enhance awareness of other's value systems."	• Empathy • Ethical inquiry Perspective-taking/Reflection
Polvani S, *et al*.(19)	Doctor-patient Relationships	• Relationship-building
Small, *et al*. (20)	"…narrative medicine can play a role in building community among diverse health care providers and promoting self-care."	• Relationship-building • Empathy Resilience and burnout detection/mitigation
Spike J.(21)	Satisfaction with program components	• Satisfaction
Walker MR, *et al*.(22)	Satisfaction and organization of program; the climate, content and leadership of the teachers was the most valued aspects of the program. The number of sessions and activities was reported as insufficient. Participants offered suggestions for improving the program.	• Satisfaction
Winkel AF, *et al*.(23)	Satisfaction with program. Residents found it enjoyable, felt more calm/clear headed and satisfied with their daily work. One resident said the writing was difficult. Described reasons for non-attendance.	• Satisfaction
Wohlmann A, Halstein M.(24)	Satisfaction; program helped to understand the patients as humans and that interpretation is important to interaction	• Satisfaction
Zohouri M.(25)	"…Three major categories in students' reflection on reading Death of Ivan Ilych as an end of life human body… 1) Emotional experience, 2) Empathy and effective communication, 3) Spirituality and dignity…this reflection activity may help medical students have a deeper idea of the end of life situation and feelings."	• Empathy • Relationship-building Perspective-taking/Reflection

Supplemental Digital Appendix 3. Records included in Narrative Medicine Systematic Review

Authors	Publication Year	Publication Type	Program Location	Number of Participants	Participant Constituency	Program Goals	Number of Sessions	Hours in Program	Program Activities	Program Evaluation
Arntfield, *et al.*(1)	2013	Article	New York, NY, USA	12	Medical students	To explore the influence of NM training on fourth-year medical students' clinical skills, including communication, collaboration, and professionalism.	4	10	Faculty facilitators used readings as a basis for discussion about illness and patient care, and to introduce reflective writing exercises. Participants responded to writing prompts and shared their narratives with the group.	Qualitative – Well Described
Aronson L, Schwalbe W.(26)	2015	Abstract	Philadelphia, PA, USA	N/S	N/S	To foster writing for wellness, advocacy, or education and to facilitate the publication of writing by healthcare professionals	1	N/S	A discussion of different modes of writing by healthcare professionals and the varied purposes of such writing. Publication strategies and venues were discussed. Participants wrote in class and received peer feedback from colleagues in a small group format.	None/Not Specified
Ball SC(27)	2011	Abstract	New York, NY, USA	N/S	Medical students	To support medicine sub interns through training in reflective writing and narrative competence	N/S	N/S	Reflected on sub internship experience, read and discussed texts, offered their perspectives on writing content and style, responded to a writing prompt, and shared their narratives.	None/Not Specified
Balmer, *et al.*(28)	2016	Abstract	Houston, TX, USA	8	Medical students, residents, faculty	To assess the feasibility of integrating NM training into clinical rotations	12	60	Engaged in literary analysis, small group discussions, and writing workshops. They also submitted a piece of writing for workshopping.	Qualitative—Incomplete Description
Balmer DF, Richards BF(2)	2012	Article	New York, NY, USA	25	Faculty	To implement a faculty development program that employed foundational tenants of NM (reading and reflection) as a means towards fostering behavioral and social sciences in medical education	N/S	N/S	Read and discussed published narratives to enhance their teaching competencies. They also generated reflective writing for the purpose of telling stories about themselves, their students, and their patients.	Qualitative – Well Described

Authors	Publication Year	Publication Type	Program Location	Number of Participants	Participant Constituency	Program Goals	Number of Sessions	Hours in Program	Program Activities	Program Evaluation
Bhavaraju VL, Miller S(29)	2014	Article	Phoenix, AZ, USA	12	Faculty	To guide residents in using reflective writing to process emotions, reactions, and motivations related to their professional lives	12	24	Opening writing prompt, discussion of doctor-patient related themes in literary pre-readings, and sharing of personal narratives.	Quantitative – Well Described
Birigwa, *et al.*(3)	2017	Abstract	New York, NY, USA	16	Residents	To employ NM for the promotion of wellbeing, self-care, mindfulness, and empathy in pediatric residents	4	4	Discussion of literature, reflective writing, art, and spirituality. Motifs explored included: self-care, narrative humility, illness, death, and giving bad news.	Qualitative – Well Described
Bobb SJ(4)	2017	Thesis	Milwaukee, WI, USA	11	Nurses	To assess the impact of NM practices on the teamwork and professional identity of NICU nurses	3	N/S	Read and discussed a narrative, followed by free-writing time based on a prompt, and sharing. Group narrative sessions were followed by semi-structured, one-on-one interviews. Finally, participants were observed while working in the NICU.	Qualitative – Well Described
Boudreau, *et al.* (5) AND Liben, *et al.*(6)	2012	2 Articles	Montreal, Canada	~ 92	Faculty	To introduce narrative theory, practice reflective writing, and discuss strategies for integrating reflective exercises into an apprenticeship.	1	3	Workshops included a didactic component as well as literary and writing exercises to develop skills in narrative and reflection.	Quantitative – Incomplete Description, Qualitative – Well Described
Brigley S, Jasper M(7)	2010	Article	Cardiff, Wales, UK	22	Faculty, trainees, administrators/staff	To develop a highly functioning, multidisciplinary faculty of practitioners in surgery operating theaters	6	36	Involved reading, reflective writing and portfolio-building for professional development in surgery faculty, trainees, and staff.	Qualitative – Well Described

Authors	Publication Year	Publication Type	Program Location	Number of Participants	Participant Constituency	Program Goals	Number of Sessions	Hours in Program	Program Activities	Program Evaluation
Chretien KC, *et al.*(8, 9)	2014, 2015	Abstract & Article	Washington D.C., USA	47	Medical students	To develop narrative competence, foster attentive listening, and promote reflection with the broader goal of empathy-formation for better patient care and improved outcomes	3	N/S	Introduced NM concepts, including a paired storytelling and listening exercise; students attentively listen to and record patient narratives of illness, and to read these back to the patients. Students also worked with patients to choose artwork to effectively represented their story; wrote reflectively about their experiences.	Qualitative – Well Described
DasGupta(11) & DasGupta , *et al.(10)*	2006	2 Articles	New York, NY, USA	~20	Resident, faculty, para-medical workers, other staff	To foster cultural competence and effective, empathic communication through a literary case study, with the aim of improving patient care	13	N/S	Sessions opened with questions about the text and conversation to discuss themes relevant to the novel, including intercultural communication, healthcare practices, and relating to chronically ill and/or dying patients.	Qualitative – Well Described
Elliott *et al.*(30) & Schaff P(31)	2006 & 2010	Article & Curriculum	Los Angeles, CA, USA	N/S	Medical students	To explore clinical skills that foster empathy and recognize the significance of narrative in relation to patients' stories, reflective writing, and appreciating vulnerability. To apply narrative competence and reflective practice skills to the clerkship experience.	1	2	Storytelling, followed by 30 minutes of discussion about the literary pre-readings, then reflective writing followed by time for sharing their narratives. Assignments included online weekly journal entries and a narrative project for the final session.	Quantitative – Incomplete Description, Qualitative— Incomplete Description

Authors	Publication Year	Publication Type	Program Location	Number of Participants	Participant Constituency	Program Goals	Number of Sessions	Hours in Program	Program Activities	Program Evaluation
Goodrich, *et al.*(12)	2005	Article	New York, NY, USA & Houston, TX, USA	48	Residents	To foster comprehension of and appreciation for the narrative basis of medicine, the ethical dimension of medical encounters, the intersection between social context and clinical decision-making, and the employment of narrative to inform decision making.	4	16	The sessions included: demonstration of the narrative aspect of clinical encounters, demonstrated the application of narrative analysis principles to medical narratives; presentations about patients and the medical chart as a form of written reflection, time to practice writing narratives; analyzed stories written by participants; demonstrated the significance of ethics and values as conveyed by narrative, discussed their learning in the program.	Quantitative – Well Described, Qualitative – Well Described
Gordon E(13)	2017	Abstract	Newark, NJ, USA	43	Residents	To identify and alleviate burnout and to foster resilience.	1	N/S	Reading a NM piece, submitting writings about meaningful patient encounters.	Qualitative – Well Described
Goupy, *et al.*(14)	2013	Article	Paris, France	41	Medical students	To teach narrative and emphasize the significance of listening and writing to better observe/interpret patients' stories and improve the doctor-patient relationship.	6	20	Included sessions on: definition of NM and ice breakers for group formation, viewing a film and related discussion, a narrative writing exercise focused on participants' stories of personal or family illness, the theme of empathy in the doctor-patient relationship, the connection between art and medicine, and an overarching discussion about uses of NM.	Quantitative – Well Described, Qualitative – Well Described
Gowda, *et al.*(15)	2017	Abstract	New York, NY, USA	~65	Residents, faculty, nurses, staff	To utilize NM in clinical settings for enhancing interprofessional education and practice while reducing burnout	40	20	Discussion of published narratives, reflective writing exercises, and peer sharing of written pieces.	Quantitative – Incomplete Description, Qualitative – Well Described

Authors	Publication Year	Publication Type	Program Location	Number of Participants	Participant Constituency	Program Goals	Number of Sessions	Hours in Program	Program Activities	Program Evaluation
Heller EA, Heller FE(32)	2016	Abstract	New York, NY, USA	N/S	Care-givers, staff, patients	To support patients and improve communication and understanding among patients, staff, and caregivers	N/S	N/S	Literature and writing are employed to foster discussion. Patients write their stories as a means of gaining a sense of autonomy over their medical trajectories. The workshop creates a trust-based community, fostering communication among caregivers, staff, and patients coping with chronic illness.	None/Not Specified
Heller-stein DJ(33)	2015	Article	New York, NY, USA	~192	Medical students	To train more effective doctors by helping preclinical medical students to engage with humanities education	6	18	Close readings and discussion of literary narratives and in-class writing assignments. Participant writings are peer-edited and re-written before submission.	None/Not Specified
Holub PG(16)	2011	Thesis	Fort Lauderdale, FL, USA	44	Students (doctoral-level health sciences)	To assess affective development of medical professionalism through online NM programming	12	12	Compared 2 programs on medical ethics and professionalism. Control involved used traditional, problem-based learning activities. Treatment involved relevant literary and multimedia narratives to supplement the text-based case studies.	Quantitative – Well Described, Qualitative – Well Described
Hurst M, Irvine C(34)	2014	Book chapter	New York, NY, USA	15-18	Students in NM master's program (including medical providers)	To positively alter attitudes about death, dying, and end-of-life-care by facilitating interdisciplinary discourse (e.g. among healthcare professionals, writers, philosophers, artists)	N/S	N/S	Discussions based on literature and film. Participants practice preparing and teaching NM lessons like what they might use in future medical education. The final assignment is a genre or media analysis focused on storytelling to understand death and dying.	None/Not Specified

Authors	Publication Year	Publication Type	Program Location	Number of Participants	Participant Constituency	Program Goals	Number of Sessions	Hours in Program	Program Activities	Program Evaluation
Jacobs ZG(35)	2017	Abstract	Pittsburgh, PA, USA	N/S	Medical students, residents, faculty	To develop a sustainable, collaborative NM workshop for fostering narrative competence and empathy, as well as for promoting well being among healthcare professionals	8	8	Explored medically-related themes by cultivating narrative competence, with a focus on literary close reading/textual analysis; reflective writing/storytelling; and interpreting art, film, and photography. Participants had the opportunity to engage in an online forum, where literary excerpts and reflective writing prompts were posted.	Quantitative – Incomplete Description
Kennedy AJ, Sgro G(17)	2016	Abstract	Pitts-burgh, PA, USA	7	Medical students, residents, faculty	To use creative nonfiction to help residents consider other perspectives, thus providing enhanced care for patients from underserved populations	4	N/S	Completed pre-readings and interviewing one of their patients at a clinic for underserved populations; they later wrote about patients. Workshops focused on narrative themes. Sessions included discussions of the pre-readings and writing to prompts, and the opportunity for participants to read their stories and receive peer feedback.	Qualitative – Satisfaction Only
Kissler, *et al.*(36)	2016	Article	Houston, TX, USA	17	Medical students	To explore how medical students' narrative reflections about their experiences in the anatomy lab might display themes relevant to professional identity formation	1	1	Read two narratives and then wrote to related prompts. Writing time was followed by a group exercise in which students had the opportunity to read their narratives and engage in discussion with peers.	None/Not Specified
Lane-Retickeer A, Fogel C(37)	2012	Abstract	Hartford, CT, USA	5	Physicians	To discuss the significance of the humanities in career development in Hospice and Palliative Medicine and overall physician wellness	N/S	N/S	Read poetry and (sometimes) perspectives pieces from medical journals, and engaged in reflective writing. By turns, participants facilitate the discussion. Also went to a local art museum and watched a film with an end-of-life theme.	None/Not Specified

Authors	Publication Year	Publication Type	Program Location	Number of Participants	Participant Constituency	Program Goals	Number of Sessions	Hours in Program	Program Activities	Program Evaluation
Machado MC, Lobo Antunes J(38)	2016	Article	Lisbon, Portugal	12	Medical students	To develop narrative competence, learn communication strategies, interpret and understand illness narratives, and cultivate reflective practice	N/S	23+	Reading literary texts, reflective dialogue, and reflective writing were employed during the theoretical component to facilitate discussion of various themes.	None/Not Specified
Mark, *et al.*(39)	2017	Abstract	Phoenix, AZ, USA	N/S	Nurses	To define and explain the theory and practice of NM, and to demonstrate how NM skills can help increase empathy and understanding for better patient care	1	1	The program introduced NM theory, methods, applications, and tools to promote trainee self-care, with a particular focus on secondary trauma.	None/Not Specified
Moss, *et al.*(40)	2014	Abstract	New York, NY, USA	27	Resident, fellows	Created and implemented an NM program to reduce burnout and increase empathy and perceptions of service culture	4	N/S	NM workshops were introduced into protected, didactic time slots. Sessions employed literature (poetry and short stories) and made time for reflective writing and group discussion to explore themes and issues.	Quantitative – Well Described
Murinson B(18)	2010	Curriculum	Baltimore, MD, USA	N/S	Medical students	To approach pain and suffering through the lens of the humanities as a means of encouraging emotional growth, developing empathy, and fostering professional value formation regarding the ethics of dealing with pain	4	8	Encouraged participants to reflect and discuss experiences of and responses to pain to foster emotional growth and develop empathy.	Quantitative – Incomplete Description, Qualitative – Well Described
Polvani, *et al.*(19)	2014	Article	Florence, Italy	70	Physicians, nurses, paramedical workers, administrators/staff	To enhance NM awareness among health professionals as a means of improving quality of care	N/S	N/S	Interviewed patients about their illness to identify critical issues. Used focus groups, theater, poems, and video recorded conversations to assess both verbal and nonverbal communication to improve doctor–patient relationships and explore communication.	Qualitative – Well Described

Authors	Publication Year	Publication Type	Program Location	Number of Participants	Participant Constituency	Program Goals	Number of Sessions	Hours in Program	Program Activities	Program Evaluation
Robeson R, King NMP(41)	2017	Article	Chapel Hill/Wake Forest, NC, USA	N/S	Medical students, graduate bioethics students (including health professionals)	To cultivate reflection and discussion related to bioethics.	N/S	N/S	Course sessions can be subdivided into three phases: discussion and analysis, research, and writing of the performable case studies (PCS).	None/Not Specified
Roy R(42)	2007	Article	Chicago, IL, USA	N/S	Medical students	To use literature and reflective writing as a means of teaching cultural competence, communication, and sensitivity	4	N/S	As pre-work, participants reviewed reflective readings based on session themes and wrote short reflective narratives. In-class time included literary analysis, discussion, and reflective writing.	Qualitative—Incomplete Description
Shankar PR(43)	2009	Article	Pokhara, Nepal	26	Medical students, faculty	To promote the advantages of the medical humanities for medical students and physicians	13	N/S	Small-group sessions included literary and art analysis, reflective writing, group discussion, role play, case studies, and debates for exploring medical humanities.	Qualitative—Incomplete Description
Small LC, *et al.*(20)	2017	Article	Baltimore, MD, USA	126	Medical students, resident, fellows, faculty, nurses, nursing students, paramedical worker, administrators/staff	To foster empathy, reflective practice, and interdisciplinary community-building among clinicians and hospital staff	18	N/S	Each session included discussion of literary readings, reflective writing based on a prompt, and sharing of participant writings.	Qualitative – Well Described
Spike J(21)	2008	Curriculum	Houston TX, USA	N/S	Medical students	To employ narrative to discuss professionalism, problem solving, and work-life balance	1	3	Pre-readings were assigned well in advance and facilitators led small-group sessions (<10 students). The session also allowed time for a short reflective writing exercise.	Quantitative – Incomplete Description, Qualitative – Satisfaction Only

Authors	Publication Year	Publication Type	Program Location	Number of Participants	Participant Constituency	Program Goals	Number of Sessions	Hours in Program	Program Activities	Program Evaluation
Walker, *et al.*(22)	2012	Article	Santiago, Chile	36	Faculty	To experiment with literary texts and writing techniques in medical education as a means of awakening creativity and facilitating reflection	6	12	Sessions included reading and reflecting on literary texts, writing, sharing, and discussing participants' narratives. At the end of the course, each participant presented a narrative to be evaluated by peers and teachers according to: theme, character(s), context, development (conflict and/or transformation), and writing technique.	Quantitative – Well Described, Qualitative – Satisfaction Only
Winkel (44) & Winkel, *et al.*(45)	2016	Article & Curri-culum	New York City, NY, USA; Chicago, IL, USA; Burlington, VT, USA	66 [43 evaluated]	Residents	To determine if an NM curriculum can reduce burnout. To train residents in reflecting on and processing their own and their patients' experiences	15	15	Used literary narratives to foster discussion focused on relevant themes. Reflective writing prompts and time for sharing participant narratives were also integrated into the curriculum.	Quantitative – Well Described
Winkel AF, *et al.*(23)	2010	Article	New York City, NY, USA	20	Residents	To reduce burnout and enhance empathy through NM and reflection	6	6	Sessions opened with reading and discussing fiction. Writing prompts were used to generate narratives in class. Participants were encouraged to read their writings to the group and invite feedback in an atmosphere of confidentiality.	Quantitative – Incomplete Description, Qualitative – Satisfaction Only
Wohlmann A, Halstein M(24)	2016	Article	Mainz, Germany	9	Medical students	To use texts and art for fostering observational skills, developing an understanding of complex illness narratives, and appreciating diverse interpretations	6	7.5	Participants engaged in close reading short stories, poems, and novels with medical motifs. Discussion included analysis of effective literary techniques and meaning. Participants engaged reflective writing and subsequent peer workshopping.	Quantitative – Incomplete Description, Qualitative – Satisfaction Only

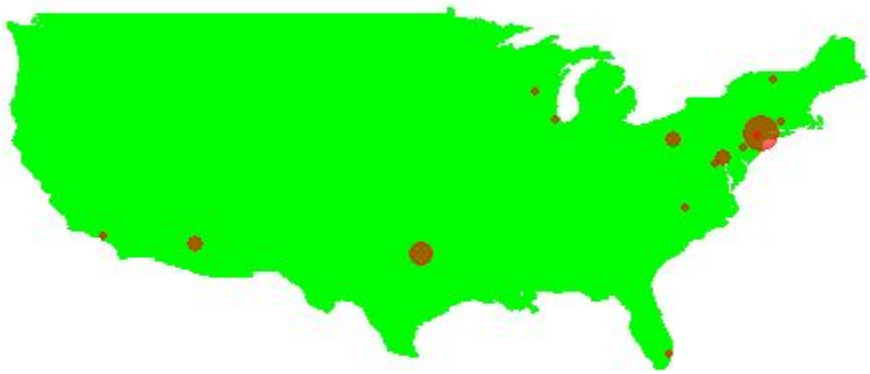
Authors	Publication Year	Publication Type	Program Location	Number of Participants	Participant Constituency	Program Goals	Number of Sessions	Hours in Program	Program Activities	Program Evaluation
Zohouri, *et al*(25).	2017	Article	Shiraz, Iran	350	Medical students	To use a literary narrative to foster reflection on end-of-life issues	1	2	Used the Kolb four-stage experiential model to write reflectively about their thoughts on a novella.	Qualitative – Well Described

[a] Abbreviations: N/S – Not specified; N/A – Not applicable

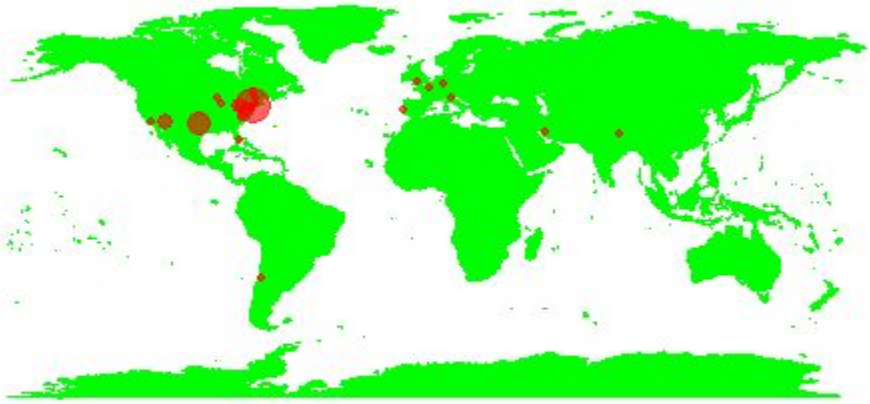
[b] Results of evaluations were not mentioned in the abstract; thus, these results have not been included with the descriptions of positive NM program outcomes discussed in the text of our review.

[c] Results were not statistically significant; thus, these results have not been included with the description of positive NM program outcomes discussed in the text of our review.

Supplemental Digital Appendix 4. Locations of Programs Included in Narrative Medicine Systematic Review



United States of America



World

Supplemental Digital Appendix 5. Quantitative and Qualitative Incomplete Evaluation Descriptions of Narrative Medicine Programs in Systematic Review[1]

Quantitative – Incomplete Description			
Reference	***Outcome–new or validated measure***	***Outcome(s)***	***Rationale for determining incomplete evaluation***
Boudreau, *et al.* AND Liben S, *et al.*(5, 6)	New	Narrative Skills Assessment Tool	Authors report no consistent differences in responses between attendees and non-attendees. Scores not reported.
Elliott D, *et al*. AND Schaff P.(30, 31)	New	1) satisfaction with workshop, 2) usefulness of workshop in enhancing perspectives about some of the guiding principles of Family Medicine, 3) value of the session	The percent agreement was reported, but not the total N or the actual wording of the evaluation questions
Gowda D, *et al.*(15)	Validated	Maslach Burnout Inventory, UtrectWork Engagement Score, Team Development, Interpersonal Reactivity	"At baseline, scores for burnout were higher for attending physicians, while scores for other instruments were comparable. Pre-post differences will be available by conference date."
Jacobs ZG, Sgro G.(35)	Validated	Maslach Burnout Inventory, Toronto Empathy Questionnaire, Interpersonal Reactivity	"The outcome of the workshop is yet to be determined, but the hope is to demonstrate that our curriculum improves participant empathy and sympathy while reducing burnout."
Murinson, B.(18)	New	Effectiveness of pain narratives on augmenting awareness of the nuances reality of pain	Authors report general high-level results in narrative. Quantitative results not reported.
Spike J.(21)	New	Satisfaction with training	Line graphs of distributions are provided for each measure as an attachment for two rounds of the training; Ns are not provided.
Winkel AF, *et al.*(23)	Validated	Maslach Burnout Inventory, Interpersonal Reactivity	"The results were not examined for quantitative trends because the numbers of participants were too small for relevant statistical analysis."
Wohlmann A, Halstein M.(24)	New	satisfaction and relevance of course to future work	Reported in text the N of particular response categories, but not of the entire scale; unable to document the full evaluation findings from what is presented in narrative.
Qualitative – Incomplete Description			
Balmer, *et al.*(28), Elliott D, *et al*. *AND* Schaff P. (30, 31), Roy R(42), Shankar PR(43)			
None/Not Specified			
Aronson L, Schwalbe W.(26), Ball SC(27) Heller FE(32), Hellerstein DJ(33), Hurst M, Irvine C(34), Kissler, *et al.*(36), Lane-Reticker A, Fogel C(37), Machado MC, Lobo A J(38), Mark, *et al.*(39), Robeson R, King NMP(41)			

[1] All Quantitative Evaluations – Well Described report evaluation at the end of the program except for Elliott D, *et al*. and Schaff P. 30. Elliott D, Schaff P, Woehrle T, Walsh A, Trial J. Narrative Reflection in Family Medicine Clerkship - Cultural Competence in the Third Year Required Clerkships. MedEdPORTAL. 2010;6(1153), 31. Schaff P. Donning the White Coat: The Narrative Threads of Professional Development. J LearnThrough the Arts. 2006;2(1):21. and Gowda D, et al.(13), which do not specify timing.

Supplemental Digital Appendix 6: Basic Checklist for Designing, Implementing, Evaluating, and Disseminating a Narrative Medicine Program in Academic Medicine/Health Sciences

Program Design

Identify participant constituency

- ❑ Allied Health Professionals
- ❑ Faculty (clinical, research)
- ❑ Graduate Health Sciences Students
- ❑ Medical Students
- ❑ Nurses
- ❑ Nursing Students
- ❑ Physician Non-Faculty
- ❑ Residents/Fellows
- ❑ Staff
- ❑ Other

Conduct a needs assessment with target constituency

- ❑ Perceived Narrative Interest
- ❑ Perceived Narrative Needs

Identify target goals and outcomes

- ❑ Burnout Detection/Mitigation
- ❑ Clinical Competence
- ❑ Confidence/Self-efficacy
- ❑ Empathy/Sympathy
- ❑ Medical Team Functioning
- ❑ Narrative Competence (including Attentive Listening)
- ❑ Participant Satisfaction
- ❑ Pedagogy Skills
- ❑ Perspective-taking
- ❑ Professionalism/Vocation
- ❑ Relationship Building
- ❑ Reflection
- ❑ Relevance to Work
- ❑ Resilience
- ❑ Wellness
- ❑ Writing Skills
- ❑ Other

Identify program timeline and session format

- ❑ Timeline
- ❑ Session Format (e.g. frequency, length)

Identify activities that will best support the achievement of specified goals and outcomes

- ❑ Group Discussion
- ❑ Group Reading
- ❑ Individual Reading
- ❑ Reflective Writing Exercises
- ❑ Sharing of In-Class Writing
- ❑ Writing Workshop
- ❑ Other

Create curriculum in accordance with selected goals and activities

- ❑ Principles of Adult Education
- ❑ Other

Formulate an evaluation methodology to best measure overall effectiveness

- ❑ Qualitative
- ❑ Quantitative
- ❑ Mixed Methods

Formulate an evaluation strategy for implementation

- ❑ Formative
- ❑ Pre/Post Summative
- ❑ Short-term
- ❑ Long-term

Consider theory of change in program design

Program Implementation

Organize logistics

- ❑ Venue
- ❑ Materials
- ❑ Food
- ❑ Other

Recruit participants

- ❑ Direct Email
- ❑ Institution-wide/Departmental Newsletters
- ❑ Word of Mouth
- ❑ Other

Distribute pre-work to participants in advance of each session

- ❑ Literary Pre-readings
- ❑ Participant-generated Narratives for Workshopping

Program Evaluation

Assess according to pre-determined evaluation strategy

- ❑ Pre-/post- program summative evaluations
- ❑ Formative evaluation at conclusion of sessions
- ❑ Short-/long-term evaluations
- ❑ Other

Map target goals to outcomes to assess effectiveness

- ❑ Attentive Listening
- ❑ Burnout Detection/Mitigation
- ❑ Clinical Competence
- ❑ Confidence/Self-efficacy
- ❑ Empathy/Sympathy
- ❑ Medical Team Functioning
- ❑ Narrative Competence
- ❑ Participant Satisfaction
- ❑ Pedagogy Skills
- ❑ Perspective-taking
- ❑ Professionalism/Vocation
- ❑ Relationship Building
- ❑ Reflection
- ❑ Relevance to Work
- ❑ Resilience
- ❑ Wellness
- ❑ Writing Skills
- ❑ Other

Program Dissemination

Identify suitable format

- ❑ Book Chapter
- ❑ Conference Presentation
- ❑ Curriculum
- ❑ Journal Article

Identify suitable target venue

- ❑ Conference
- ❑ Journal
- ❑ Website
- ❑ Other

Include relevant program details for successful replication at other institutions

- ❑ Conceptualization
- ❑ Scope
- ❑ Design
- ❑ Goals
- ❑ Activities
- ❑ Curriculum
- ❑ Evaluation Methodology
- ❑ Evaluation Results

Submit to target venue

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PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2-4
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	6-7
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	7-8
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	N/A
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	8-9
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	9-10; Appendix
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	9-10; Appendix
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	10-12
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	10-12
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	10-12
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	10-12
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	10-12
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	10-12

PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	10-12
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	10-12
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	Figure 1; Table 1
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	12-17; Tables; Appendix
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see Item 12).	12-17; 24-25; Tables; Appendix
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	12-17; Tables; Appendix
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	12-17; Tables
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	12-17; 24-25
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	12-17
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	17-23
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	24-25
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	25-26
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	35

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

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BMJ Open

Content and Outcomes of Narrative Medicine Programs: A Systematic Review of the Literature through 2017

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2019-031568
Article Type:	Research
Date Submitted by the Author:	09-May-2019
Complete List of Authors:	Di Frances, Christy; Boston University School of Medicine, Medicine; Childs, Ellen; Boston University School of Public Health Pasco, John; Boston University School of Medicine Trinquart , L; Boston University School of Public Health Flynn, David; Boston University School of Medicine Wingerter, Sarah; Boston University School of Medicine Bhasin, Robina; Boston University School of Medicine Demers, Lindsay; Boston University School of Medicine Benjamin, Emelia; Boston University School of Medicine
Keywords:	MEDICAL EDUCATION & TRAINING, MEDICAL ETHICS, EDUCATION & TRAINING (see Medical Education & Training)

Content and Outcomes of Narrative Medicine Programs:

A Systematic Review of the Literature through 2017

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Content and Outcomes of Narrative Medicine Programs: A Systematic Review of the Literature through 2017

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Article Word Count

4,603 words

Content and Outcomes of Narrative Medicine Programs: A Systematic Review of the Literature through 2017

Abstract

Objectives

Narrative Medicine incorporates stories into health sciences paradigms as fundamental aspects of the human experience. The aim of this systematic review is to document objectives, content, and evaluation outcomes of narrative medicine programs implemented in academic medicine and health sciences with the goal of providing recommendations regarding best practices for future narrative-based education.

Methods

The authors conducted a systematic review of literature published through 2017. Eligible programming included textual analysis/close reading of published literature and creative/reflective writing. Qualifying participants comprised individuals from health sciences disciplines at varying levels. The authors reviewed and categorized program goals, content, and evaluation activities.

Results

Of 1,712 identified records, 45 records (40 unique programs) were included. The authors documented program scope and evaluation design/methods to assess participant satisfaction and program efficacy. Evaluation methods lacked consistency, with only 75% (n=30) of programs reporting any form of evaluation. Some programs lacked thorough evaluations descriptions. Quantitative and qualitative evaluations deemed as well described assessed participant satisfaction and various competencies. Fifteen programs used

Content and Outcomes of Narrative Medicine Programs: A Systematic Review of the Literature through 2017

quantitative evaluation (7 well described), whereas 26 programs used qualitative evaluation (22 well described). Well-described quantitative evaluations relied on 20 different measures (7 validated) and showed evidence of high participant satisfaction and pre-post improvement in empathy, perspective-taking/reflection, resilience and burnout detection/mitigation, confidence/personal accomplishment, relevance to work, and pedagogical skills. A median of 90.5% of participants agreed or strongly agreed that the program had positive outcomes. Qualitative evaluation identified high participant satisfaction and improvement in relationship-building, empathy, perspective-taking/reflection, resilience and burnout detection/mitigation, confidence and personal accomplishment, narrative competence, relevance to work, pedagogical skills, ethical inquiry, cultural competence, and institutional impact.

Conclusion

Evaluation suggests that narrative medicine programming leads to high participant satisfaction and positive outcomes across various competencies. The authors suggest best practices and innovative future directions for the implementation and evaluation of narrative medicine programs.

Content and Outcomes of Narrative Medicine Programs: A Systematic Review of the Literature through 2017

Article Summary

Strengths and Limitations of this Study

- The inclusion criteria based record eligibility upon the scope, participants, and educational activities of narrative medicine programming implemented within academic health sciences worldwide through 2017.
- The research strategy involved creating and executing optimized searches of five major electronic databases—PubMed, Embase, PsycINFO, ERIC, and MedEdPORTAL—and generated 1,264 records after the removal of duplicates.
- Data analysis was accomplished through independent screening by members of the research team, resulting in the selection of forty programs for inclusion in the systematic review.
- Program information related to scope, participants, educational activities, and evaluation design/methods was thematically coded to facilitate data analysis; some degree of subjectivity was inevitable due to the complexities inherent to synthesizing mixed data from educational evaluations utilizing varying methodologies.
- Evaluation designs and methods were examined for rigor and well-described quantitative and qualitative outcomes were investigated to examine participant satisfaction and learning, with qualitative studies highlighting a more nuanced breadth of outcomes regarding personal and professional benefits for participants.

**Content and Outcomes of Narrative Medicine Programs:
A Systematic Review of the Literature through 2017**

Introduction

Narrative medicine (**NM**) is a framework for medicine and health sciences that values individuals' stories and experiences as integral aspects of the lived experience of health and illness. Historically, the fields of knowledge associated with medicine/science and narrative/humanities were more integrated until about the nineteenth century.[1] Likewise, the proliferation of specialization within medicine is a relatively modern conceptualization that has necessitated advanced technical training, leaving less space in educational curricula for the cultivation of humanistic disciplines.[2] Significantly, whereas the recommendations of the 1910 Flexner Report[3] pertaining to science-focused pre-medical and medical curricula reform have been heeded, its implications related to the importance of broader, humanities-focused training for aspiring physicians have gone largely neglected.[4,5] However, with the rapid evolution of twentieth-century medical technology, educational paradigms must shift to prepare well-rounded clinical and research professionals.[4,6,7] In contemporary healthcare models, which sometimes fail to deliver holistic, patient-centered care, the core tenets of NM have emerged as a means of enhancing clinical care and promoting wellness.

Scholarly discussion of literature and medicine surfaced in academic literature in the 1970s.[8] By 1995, one third of American medical schools had incorporated literature courses into their curricula.[9] Rita Charon introduced the term *narrative medicine* into the medical lexicon in 2001.[8,10,11] NM continues to evolve as a framework for healthcare based on Charon's assertion that: "The effective practice of medicine requires narrative competence, that is, the ability to acknowledge, absorb, interpret, and act on the stories and

plights of others. Medicine practiced with narrative competence, called *narrative medicine*, is proposed as a model for humane and effective medical practice."[11]

The integration of narrative and medicine offers benefits to healthcare providers as well as to patients, since the NM framework draws upon literature's unique ability to augment clinical competencies, enhance the moral imagination, and foster interpersonal understanding.[9,12] Narrative-based education shows promise for promoting communication,[13] cultural competence,[14] empathy,[15-17] and professionalism,[18] as well as for enhancing vitality and mitigating burnout.[19-21] To reap the benefits associated with NM, many academic medical institutions have implemented humanities-based educational initiatives into the curricula.[22] Most NM programs utilize a combination of activities, including reading literary narratives, participating in group discussion, engaging in writing exercises, workshopping peer narratives, interviewing patients, and creating portfolios.

To date, however, few studies exist that examine and interpret efficacy trends in NM programming as a whole, nor does the current literature assess overarching unmet needs. We report a systematic review of the objectives, contents, and evaluation outcomes of existing NM programs as a means of answering the research question: how effective is the implementation and evaluation of NM programs in academic medicine and health sciences? We also provide best-practice recommendations and new directions for future narrative-based programming.

Three prior systematic reviews have considered specific aspects of NM. Barber and Moreno-Leguizamon examined whether NM education fosters compassionate care for

adult patients.[23] Chen and Forbes concluded that reflective writing—one component of NM—may enhance empathy in medical students and thus could warrant inclusion in medical school curricula.[24] Fioretti et al. focused on the experience of patients and their caregivers through a lens of NM and indicated a need for clarity and specificity in NM research protocols.[25]

To our knowledge, no systematic review has addressed the overall effectiveness of NM programs offered to healthcare professionals and implemented in academic health sciences centers, including medical schools and hospitals. We sought to identify areas in which innovative NM programming may meet existing needs for both clinicians and biomedical researchers at all career stages, including students, residents, clinical and research fellows, and faculty. In addition, we identified areas for improvement in the reporting of the design and evaluation of NM programs.

Methods

Criteria for selecting studies for this review

To be eligible for inclusion in the systematic review, a record had to document NM programming implemented within academic health sciences. We excluded articles, abstracts, commentary, or perspective pieces focused exclusively on NM theory.

Record eligibility also was contingent on the constituencies to which NM programming was offered. We considered a broad target audience consisting of one or more of the following: 1) graduate medical, dental, or health sciences students, including candidates for

MD, DMD, PhD, MS, and MPH degrees; 2) undergraduate or graduate nursing and allied health students; 3) medical, dental, nursing, or health sciences trainees, including residents, clinical fellows, and research fellows; 4) nurses; 5) allied health professionals; 6) faculty in the medical, dental, and health sciences; and 7) non-faculty physicians.

A third inclusion criterion involved the educational components of NM training. The history of literature and medicine is grounded in both literary analysis and narrative writing,[9] although some scholars consider reflective/creative writing to be a relatively recent addition to NM programming.[8] Nevertheless, writing is a singularly effective means of fostering reflection.[26] Therefore, we specified that, to be eligible for the systematic review, NM trainings had to include **both** essential components of NM imbedded in the programmatic core: 1) textual analysis/close reading of published literature (e.g. poetry, fiction, creative non-fiction) and 2) creative/reflective writing.

Search methods for identification of studies

We consulted the Boston University School of Medicine Assistant Director of Library and Information Management Education to design a search strategy for the systematic review. Our information sources included five major databases: PubMed, Embase, PsycINFO, ERIC, and MedEdPORTAL. PubMed—an online repository of the US National Library of Medicine, National Institutes of Health—is home to over 29 million citations in the realm of biomedical literature. Likewise, Embase indexes significant biomedical literature from across the globe. PsycINFO, the expansive database of the American Psychological Association, focuses on up-to-date behavioral and social science research. ERIC represents

the U.S. Department of Education's Institute of Education Sciences online research library. MedEdPORTAL is a database of program curricula provided by the Association of American Medical Colleges. Strategies were optimized for each database to make the best use of that resource's specific Controlled Vocabulary or preferred search syntax. This is a best practice endorsed by and documented in the *Cochrane Handbook for Systematic Reviews for Interventions*.[27] The databases were searched in their entirety through the end of 2017. A table documenting our electronic search strategy is presented in **Supplemental Digital Appendix 1**.

Data collection and analysis

We assessed the records identified during the literature search using a two-round, iterative process to reach consensus on eligibility (**Figure 1**),[28] independently screening the 1,264 record abstracts after the removal of duplicates. If an abstract was unavailable, the article text was consulted when possible. To be considered eligible, records had to meet all inclusion criteria. Based on the first round of screening, 125 records qualified for full-text assessment.

During the second screening stage, we read the full texts of records, identifying a further 80 records to exclude due to our discovering upon full text review that they did not meet our established eligibility criteria (**Figure 1**). Following the full-text screening, 45 records qualified for review.[14,21,29-69] However, we discovered that several qualifying records addressed identical NM programming efforts at the same institution: that is, 10 records [14,21,37,38,40-44,66] represented 5 programs. We considered programs represented by more than

one publication type together, thus resulting in 40 unique NM programs being included in the systematic review.

We performed the data collection independently, analyzing the 40 eligible programs to identify significant information and classifying relevant data for assessing the overall effectiveness of NM in academic medical centers. We then cross-checked our results for reliability. Initially, we extracted verbatim data according to date(s) of publication; institution type; geographic location; participant information; program goals, scope, and activities; evaluation methods (**Table 1**); well-described evaluation outcomes (**Table 2, Supplemental Digital Appendix 2**); and evaluation competencies (**Table 3**). We coded and synthesized the verbatim data regarding program context, design, goals, and evaluation according to broad themes (**Supplemental Digital Appendix 3)**.

Since we were particularly interested in identifying the outcomes, as well as the curricular content and goals of NM education, we paid special attention to categorizing evaluation methodology used for assessing program evaluations. We classified programs according to whether or not they were evaluated, and then differentiated the evaluated programs according to evaluation design and method. We stratified program evaluation based on the type of methods used (qualitative versus quantitative), the thoroughness of the description of the evaluation, including whether the methods and analysis strategy were discussed, and results reported.

In regards to evaluation design, programs were categorized as: 1) cross-sectional, including all programs with post-program evaluation without a comparator; 2) controlled or

uncontrolled pre-post test, including all programs that included both a pre-test and a post-test; and 3) randomized step-wedge design, including all programs that used a step-wedge design to examine program impact on participants randomized to participate at different time points. We were open to including other evaluation designs, but only the three designs discussed here emerged from our analysis of the NM programs included in the systematic review.

In addition to tracking overall evaluation strategies, we used grounded analysis to analyze the extracted data. Hence, program goals did not necessarily map neatly onto actual outcomes. We recorded the well-described evaluation of specific NM-related competencies according to the following thematic groupings: participant satisfaction, relationship-building, empathy, perspective-taking and reflection, resilience and burnout detection/mitigation, confidence/personal accomplishment, narrative competence, relevance to work, pedagogical skills, ethical inquiry, cultural competence, and institutional impact. Attentive listening practices are included in the relationship building and narrative competence thematic groupings.

Results

Descriptive Statistics

Table 1 summarizes the descriptive statistics of all 40 programs included in our review. The programs included in our review were documented and disseminated through a variety of media, including articles (n=25), abstracts (n=13), *MedEdPORTAL* curricula (n=4),

unpublished theses (n=2), and a book chapter (n=1). Publication dates were from 2005 to 2017, with the median year of publication being 2014.

NM programming efforts reported in the literature were concentrated in relatively high-resource settings. The bulk of trainings occurred in North America (n=32, 80.0%), followed by Europe (n=5, 12.5%), Asia (n=2, 5.0%), and South America (n=1, 2.5%). See **Supplemental Digital Appendix 4** for a map of NM program locations.

NM program participants and size varied. Programming was offered for medical students (n=19, 47.5%), faculty and non-faculty physicians (n=15, 37.5%), resident and fellow clinical trainees (n=13, 32.5%), other staff (n=7, 17.5%), nurses and nursing students (n=6, 15%), and other students (n=2, 5.0%). Some programs were open to more than one of the above constituencies. Numbers of participants ranged from 5 to 350 individuals (median, 26; Q1-Q3, 13-48); for 10 programs, participant constituency, and/or numbers were not provided.

The number of sessions offered by NM programs was highly heterogeneous, running the gamut from a single workshop or seminar to as many as 40 half-hour sessions offered over the course of a year.[48] The median number of sessions offered was 4 (Q1-Q3: 3-9). The number of hours of programming offered was similarly highly variable, ranging from 1 to 60, with 9 being the median (Q1-Q3: 3-20).

NM programs specified one or several educational objectives related to both narrative and clinical/medical skills. We grouped programmatic goals involving narrative skills into several categories, including the cultivation of reflection (n=17, 42.5%); communication,

attentive listening, and narrative competence (n=15, 37.5%); empathy (n=13, 32.5%); resilience and burnout detection and/or reduction (n=7, 17.5%); cultural competence (n=3, 7.5%); wellness (n=3, 7.5%); narrative skills for pedagogy (n=2, 5%); and writing (n=2, 5%). Programmatic goals related to clinical/medical skills sought to employ NM to foster clinical competence (n=13, 32.5%); enhanced sense of professionalism and vocation (n=11, 27.5%); and successful medical team functioning (n=5, 12.5%).

In order to achieve the stated programming goals, NM curricula relied on a combination of activities, including group discussion, typically based on literary readings (n=34, 85.0%); writing exercises (n=32, 80%); sharing and/or workshopping participants' writing (n=25, 62.5%); reading together as a group (n=23, 57.5%); and other narrative-based exercises (n=15, 37.5%), such as conducting patient interviews and writing patients' stories, creating portfolios, participating in an online forum, and even—in two instances—presenting a play.

NM Program Evaluation

The reporting of NM program evaluations varied across programs and publication types. Ten programs did not report any evaluation activities. For programs reporting quantitative evaluations, we identified seven as well described and eight that reported some quantitative methods but were not thoroughly described. Programs were deemed as "not well described" if they did not include full details regarding evaluation methods. See **Table 2** for explanations for programs deemed as well defined; incomplete quantitative and qualitative program evaluations are recorded in **Supplemental Digital Appendix 5**. For

programs reporting qualitative evaluations, we identified 22 as well described and four that were not described thoroughly. Only three NM programs were deemed as having both quantitative and qualitative evaluation methods that were well described.[45,47,51]

Evaluation designs varied across NM programs and included the use of cross-sectional designs, pre-post designs, and randomized step-wedge designs. Of the evaluations we identified as well described, twenty-five evaluations used a cross-sectional design with a post-test only. Of the evaluations utilizing a cross-sectional design, most had only an immediate post-test (n=22), one had an immediate post-test and a long-term post-test (1.5 years later),[29] and one had a long-term post-test only (1.5 year).[70] One evaluation did not report the timing of the post-test.[48] Of the three evaluations that used a pre-post design, two did a pre-test and immediate post-test, and one did a pre-test and long-term post-test (1 year).[21,66] One evaluation used a randomized step-wedge design in which participants were randomized into two groups, and the groups participated in the program at different times.[37,38] Post-tests of program participants were compared to pre-tests of those who had not yet participated in the program.

Overall, the evaluations demonstrated that NM programming can have a variety of positive impacts on healthcare providers (**Tables 2 and 3**). Quantitative evaluations provide evidence for modest gains in areas related to pedagogy, empathy, and perspective-taking; whereas qualitative evaluations identified gains related to confidence, relevance of work, institutional impact, pedagogy, relationship-building, perspective-taking and reflection, resilience and burnout detection or mitigation, narrative competence, cultural competence, ethical inquiry, and increased sense of personal accomplishment (**Tables 2 and 3**). In

addition to evaluating the impact of the program on participants, many evaluation strategies focused on evaluating participants' satisfaction of the program. NM satisfaction scores were reported to be high, with the combined percent agree or strongly agree to the satisfaction measures as 93.6% (our calculation). However, satisfaction outcomes were not necessarily indicative of subsequent changes in the behavior or experiences of health sciences professionals who engaged in the programming.

Of quantitative programs deemed as well described, four reported high satisfaction,[45,47,59,65] while modest and positive but not statistically significant impacts were reported on: pedagogical skills (n=1),[34] relevance to professional work (n=1),[59] resilience and burnout detection/mitigation (n=1) , and confidence/increased sense of personal accomplishment (n=2).[21,34,66] Programs that reported statistically significant programmatic impacts examined increased empathy (n=2),[21,51,66] and increased perspective-taking/reflection (n=1).[21,66]

Of qualitative programs deemed as well described, 8 reported high satisfaction,[37,38,40,41,54,65,67,68,71] while positive impacts were reported on: relationship-building (n=11),[14,33,35,36,39-42,45,48,61,69,70] empathy (n=7),[14,42,45,48,51,60,69,70] perspective-taking/reflection (n=5),[14,33,35,36,39,42,45,60,69,70] resilience and burnout detection/mitigation (n=4),[35,46,48,70] narrative competence (n=3),[37,38,40,41,45] confidence/personal accomplishment (n=2),[29,36] ethical inquiry (n=2)[45,60] relevance to work (n=1),[29] pedagogical skills (n=1),[33] cultural competence (n=1),[14,42] and institutional impact (n=1).[33] The qualitative studies highlighted a more nuanced breadth of outcomes regarding personal and professional benefits for participants in NM programs.

We observed that the stated goals of NM programs were not always reflective of the reported evaluation outcomes. Programs identified a variety of goals, but a striking number did not report actual evaluation results (n=9) [30,49,50,52,55-58,72] or only discussed general participant satisfaction (n=6).[47,54,65,67,68,73] We found the evaluation methods and outcomes of many programs to be insufficiently developed or described.

Discussion

Our review of 40 NM programs demonstrated modest but positive varied benefits related to narrative-based education for health science professionals, reflective of the remarkable diversity of the trainings implemented. From a geographical perspective, the bulk of programs took place in North America, followed by Europe. Audiences varied, but the highest concentration of programs were targeted at medical students, followed by trainees (residents and fellows), and then faculty and non-faculty physicians. Program goals encompassed a range of narrative and clinical skills. Program activities tended to concentrate on reading and discussion, as well as on reflective writing exercises.

Most evaluation designs utilized a cross-sectional, post-test only evaluation, which did not allow evaluators to understand the relative impact of the program. Only seven programs compared participants before and after the NM training, using either a pre-post or step-wedge design. Only four programs evaluated the long-term impact of the training, with post-program evaluations conducted between one month and one and a half years after program completion. The majority of programming was evaluated by qualitative, quantitative, or mixed methods for satisfaction and/or efficacy. Despite an emphasis on the

value of writing, no programs used an evaluation deemed to be well described to assess gains in writing competence/confidence, and a surprisingly high number (n=10, 25%) of NM programs provided no details regarding evaluation design or methodology.

Whereas previous systematic reviews have concluded that NM education may be beneficial in contributing to the delivery of compassionate care[23] and that reflective writing may help to enhance empathy in medical students,[24] our research builds upon the current literature to reveal a broad range of NM benefits. Our findings demonstrate that NM has shown potential for enhancing communication and team-building skills; encouraging perspective-taking and reflection; promoting empathic behavior; detecting/mitigating burnout; cultivating narrative competence; augmenting pedagogical skills, and fostering ethical inquiry.

Based on our analysis and interpretation of the programs reviewed, we recommend considering the inclusion of narrative-based education in curricula for medical/health sciences students, trainees, and faculty. We also suggest several best practices and new directions for future NM programming efforts as a means of increasing intervention efficacy and providing broader accessibility.

Recommended Best Practices and Future Directions for NM

Enhanced Program Evaluation Methods

Our research has noted that a substantial number of NM programs did not report any evaluation activities, while others only evaluated general participant satisfaction. Further,

in programs that were evaluated, evaluation design was highly variable, with the majority lacking assessment of long-term impact. Without carefully evaluating the short- and long-term outcomes of educational programming for gaining particular skills and competencies, it is difficult to continue assessing accurately whether NM programming addresses the unique needs of health sciences professionals in academic medicine and health sciences. Given the intense time constraints of the constituency, we submit that program evaluation is critical to ensure that time spent in a NM program is used effectively.

Quantifying the long-term impact of NM objectives, such as fostering empathy and ethical decision-making, is challenging—and certainly complicates the integration of NM training into continuing medical education curricula.[74] Nevertheless, education experts contend that medical ethics and humanities training, including narrative-based reasoning, is fundamental to the professional development of healthcare practitioners.[75] Ensuring the integration of relevant NM programming into educational curricula for the next generation of health sciences professionals requires strategic planning, thorough evaluation, and ongoing analysis. We have constructed a basic checklist for developing, implementing, evaluating, and disseminating a NM training, regardless of individualized program focus (**Supplemental Digital Appendix 6**).

Focus on Narrative Writing Skills

Narrative writing has the potential to leverage storytelling as an aspect of personal and professional growth. The literature supports that faculty writing groups and workshops can promote publications and presentations,[76-78] improve writing skills,[77,79] and bolster

confidence in writing.[77,78,80] However, we identified only one NM intervention that reported the development of writing skills as a program goal,[30] rather than the use of writing as a means towards achieving other stated outcomes, such as the cultivation of reflection or empathy skills. While no program reported evaluation of writing-related competencies in a manner deemed well-described, two programs reported that participants valued the opportunity to improve writing skills[54] and augment self-efficacy in writing/leading writing exercises.[34]

NM programming that includes training in writing competencies and self-efficacy represents an innovative educational model for accomplishing both the traditional goals of NM—e.g. empathy, communication, professionalism, resilience—and the additional outcome of fostering writing competencies. We recommend expanding future NM program objectives to include the development of enhanced writing skills and self-efficacy related to the writing process as measurable learning outcomes. Such a goal may be accomplished through a blend of expert-led instruction in literary theory, close reading of published literary texts, and workshopping of peer narratives, with the goal of coaching faculty to generate perspective pieces, advocacy narratives, creative writing projects, and educational texts for submission to peer-reviewed journals.

NM for Scientists

To date, a dearth of research exists regarding the occurrence and effectiveness of NM programming for scientists, and we submit that this knowledge gap should be addressed by the implementation and evaluation of narrative-based education for this constituency. The

NM programs analyzed in the current review were overwhelmingly geared toward clinical professionals, including physicians, nurses, clinical fellows, residents, medical students, and clinically-oriented staff. However, many of the programs' positive outcomes may be equally valuable for research faculty, postdoctoral fellows, and graduate students in the health sciences, who may benefit from narrative-based training to enhance communication and relationship-building skills, writing and teaching competencies, cross-cultural awareness, understanding of ethical inquiry and behavior, cross-disciplinary understanding, and professional identity formation.

While much attention has been given to clinician stress and burnout, NM also may prove beneficial for researchers navigating the stressors of a historically challenging funding climate. The inclusion of both clinical and research-focused professionals in NM programming has potential to foster interdisciplinary understanding, build affinity, and offer collaborative opportunities to groups who tend to operate in silos.

NM for Detecting and Mitigating Burnout

Given current concerns surrounding stress and burnout among professionals in medicine and health sciences[81-86] a need exists to identify and implement sustainable programming for cultivating resilience. Six programs evaluated the impact of NM education on resilience and burnout detection and/or mitigation.[21,35,46,48,66,70] While in one case quantitative evaluations of burnout after an NM training did not demonstrate statistical significance,[67] other programs suggested positive results regarding the use of NM for burnout identification and reduction.

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Although NM programs offer a promising initial step towards employing narrative-based education for resilience, additional research is needed to demonstrate the potential impact of NM education on physician and scientist wellness, particularly in specialties and contexts with high burnout rates. While preliminary studies have explored how narrative practice and reflective practice may be an effective intervention for front-line medical responders working in the burnout-prone context of international humanitarian frameworks,[87,88] reports on research, development, and implementation of NM programming for such constituencies are scarce. Therefore, we suggest further development and evaluation of narrative-based education focused on burnout detection and mitigation—with the potential for adapting successful NM programming to burnout-prone health care contexts beyond academic medicine, including among humanitarian and military front-line medical providers.

NM for Cultural Competence

Several programs included in our review expressed increased cultural competence, communication and/or sensitivity as primary or secondary goals.[14,42,54,60,62] Given the power of literature for developing empathy[89] and expanding the moral imagination,[9] it is probable that NM programming could serve a unique role in fostering cultural sensitivity and illuminating unconscious bias, particularly since literature has been posited as a powerful vehicle for exploring themes of racial justice within medicine.[90] We therefore recommend additional research into NM education as a vehicle for promoting cultural competence,[91] which might be accomplished in a variety of ways, including by imbedding

narrative-based learning modules into unconscious bias trainings already taking place within academic health sciences.

NM for Low-Resource Settings

From a global perspective, NM programming efforts to date have been based primarily in high-resourced medical areas. There are opportunities for educational partnerships among institutions located in disparate geographic and socioeconomic settings both within the United States and abroad. Certainly the appearance of NM programming worldwide demonstrates a burgeoning global interest in the field, with 20.0% of training having been implemented outside the United States in recent years: Nepal in 2009,[63] the United Kingdom in 2010,[39] Canada and Chile in 2012,[37,38,65] France in 2013,[47] Italy in 2014,[61] Germany and Portugal in 2016,[57,68] and Iran in 2017.[69]

The increasing interest in NM education on a global level, including in some lower-resource settings, offers potential for development of scalable curricula that can be shared with resource-limited locations where humanities and medicine training curricula may still be scarce, as was reported to be the case in Nepal.[63] One potential strategy for implementing NM programming in lower-resource settings would be to create curricula for blended online and in-person educational modules. This type of program could leverage videoconferencing technology to connect first-time course implementers with more experienced facilitators located in higher-resource settings, allowing for peer mentoring using NM as both a healthcare framework and an educational tool.

Limitations

We acknowledge several limitations to our systematic review. First, thirteen (29%) qualifying records were abstracts, which by nature provide far less information than articles, curricula, unpublished theses, or book chapters. Second, our results are inevitably subject to potential publication bias, since programs with positive results are more likely to have been submitted and selected for publication. While the NM records made little mention of negative or neutral aspects of NM programming, such factors undoubtedly exist, including institutional funding limitations, faculty unfamiliarity, and participant time constraints. Furthermore, we noted the stated definition of NM to be inconsistent even within publications/programs that met our inclusion criteria, a factor which may have led to some lack of consistency within reports of program objectives, evaluations, and outcomes.

We recognize the inevitable complexities and potential pitfalls of synthesizing mixed data from educational evaluations that have utilized varying methodologies.[92] In particular, given our reliance on qualitative analysis when synthesizing the data, there is inevitably some element of subjectivity involved in data reporting and interpretation. Although we have made a good faith effort in our work, we do recognize that a degree of subjectivity is inevitable.

Finally, while we have provided discussion regarding ways in which the general thematic schema of NM program effectiveness may be transferable to future educational efforts, we nevertheless are aware that it is unclear how transferable the results of any specific program

may be, since many dimensions influence the impact of NM programming, including the unique participants, facilitator, curriculum, and frequency/duration of sessions. To a great extent, however, this challenge supersedes NM and remains ubiquitous to medical education as a whole.

Conclusion

Despite being a relative newcomer to contemporary medical education, NM programs already have resulted in a range of positive outcomes for health sciences professionals, including enhancing narrative competence, communication, and empathy; detecting and mitigating burnout; fostering reflection with regard to professional identity formation; promoting team-building; and facilitating teaching competencies. There are doubtless institutional barriers to overcome in implementing NM programming, including obtaining sufficient institutional or outside funding, augmenting conceptual understanding with medical education committees regarding the positive outcomes of narrative-based education, and providing protected time for faculty/trainee participation in NM curricula. Nevertheless, NM education shows promise for addressing some of the most pressing concerns for today's health sciences professionals, including high suicide rates, depression, and burnout compounded with declining research funding, shorter patient visit times, mounting paperwork, and decreased job satisfaction. Such challenges necessitate innovative solutions—and NM may prove to be a highly resource-effective solution.

Implications for Research

We advise that NM programming best practices and future directions should include the

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use of robust evaluation mechanisms; inclusion of writing training as an additional learning outcome; and the development and implementation of NM for researchers, burnout-prone providers/contexts, cultural competence trainings, and lower-resource settings. We hope our systematic review helps to further the integration of narrative-based education into curricula at all levels in academic health sciences with a view toward nurturing resilient, reflective, and emotionally intelligent professionals who, in turn, will provide better patient care, health sciences education and research, and public health.

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Tables

Table 1: Descriptive Statistics of 40 Programs in Narrative Medicine Systematic Review

Publication Year	2014 [2011-2016][a]
Publication Type[b]	
Article	25 [c] (55.5)
Abstract	13 [c] (28.8)
Curriculum	4 [c] (8.8)
Unpublished Theses	2 (4.4)
Book Chapter	1 (2.2)
Program Location	
USA/Canada	32 (80.0)
Europe	5 (12.5)
South/Western Asia	2 (5.0)
South America	1 (2.5)
Number of Participants	26 [13-48]
Constituency[d]	
Medical Students	19 (47.5)
Faculty/Physician Non-Faculty	15 (37.5)
Residents/Fellows	13 (32.5)
Other staff (e.g. administrators, paramedical personnel, community workers)	7 (17.5)
Nurses/Nursing Students	6 (15.0)
Other students (e.g. graduate students)	2 (5.0)
Program Goals[d]	
Narrative Goals[d]	
Reflection	17 (42.5)
Communication/Attentive Listening/Narrative Competence	15 (37.5)
Empathy	13 (32.5)
Resilience/Burnout Detection/Mitigation	7 (17.5)
Cultural Competence	3 (7.5)
Wellness	3 (7.5)
Narrative Skills for Pedagogy	2 (5.0)
Writing	2 (5.0)
Clinical/Medical Skills[d]	
Clinical Competence	13 (32.5)
Professionalism and Vocation	11 (27.5)
Medical Team Functioning	5 (12.5)
Number of Sessions	4 [3-9]
Hours in Program	9 [3-20]
Program Activities[c]	
Group Discussion	34 (85.0)
Writing Exercises	32 (80.0)
Sharing Writing/Workshop	25 (62.5)
Group Reading	23 (57.5)
Other (e.g. interviews, observations, portfolios, writing a patient's story, online forum)	15 (37.5)
Program Evaluation Methods[e]	
Quantitative – Well Described	7 (17.5)
Quantitative – Incomplete Description	8 (20.0)
Qualitative – Well Described	22 (55.0)

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Qualitative—Incomplete Description	4 (10.0)
None/Not Specified	10 (25.0)

Data are median [Q1-Q3] or frequencies (%); [a]2 studies in the same year counted as one program; 2 studies in different years counted as two programs; [b]Percentages are calculated based on 45 records. [c]Program was represented by more than one publication type (e.g., article and curriculum);[d]Responses are not mutually exclusive, so percentages are over 100%; [e]11 studies used a mixed methods, with both qualitative and quantitative outcomes reported, so percentages are over 100%

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Table 2: Quantitative and Qualitative Well Described Evaluations of Narrative Medicine Programs in Systematic Review[a]

2A. Quantitative Evaluations – Well Described								
Reference	***New or Validated Outcome***	***Outcome***	***Outcomes– Thematic Grouping***	***N***	***Pre Mean (SD)***	***Post Mean (SD)***	***Mean Change (SD)***	***P Value***
Quantitative Studies Using Pre-post Test Design								
Bhavaraju VL, Miller S.[34]	New	Confidence in writing and leading writing exercises	• Confidence/ Personal Accomplishment • Pedagogical Skills	12	3.1	4.2	1.1	N.R.
	New	Confidence in leading literary discussions	• Confidence/ Personal Accomplishment • Pedagogical Skills	10	3.7	4.4	0.7	N.R.
	New	Integration of tools gained in training into teaching	• Pedagogical Skills	10	2.2	2.7	0.5	N.R.
Goupy F, *et al*.[47]	New	Interest of topic	• Satisfaction	41	N/A	1.84 (0.82)	N/A	N/A
	New	Satisfaction with choice of theme	• Satisfaction	41	N/A	2.13 (0.72)	N/A	N/A
	New	Satisfaction of discussion related to theme	• Satisfaction	41	N/A	2.30 (0.62)	N/A	N/A
Holub PG.[51]	Validated	JSPE – Control Group	• Empathy	41	119.10 (15.64)	116.15 (16.15)	- 2.95 (6.77)	0.001
	Validated	JSPE – Treatment Group		41	119.28 (9.05)	124.48 (8.47)	5.10 (7.20)	
Winkel AND Winkel	Validated	Maslach Burnout Inventory: Emotional Exhaustion	• Resilience and burnout detection/mitigation	43	N.R.	N.R.	- 2.0 (8.7)	0.12
	Validated	Maslach Burnout Inventory: Depersonalization	• Resilience and burnout detection/mitigation	43	N.R.	N.R.	0.1 (4.0)	0.61
	Validated	Maslach Burnout Inventory: Personal Accomplishment	• Personal accomplishment	43	N.R.	N.R.	1.2 (7.1)	0.70

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AF, *et al.*[21,66]	Validated	Interpersonal Reactivity: Empathic Concern	• Empathy	43	N.R.	N.R.	0.76 (5.9)	0.01
	Validated	Interpersonal Reactivity: Perspective Taking	• Perspective-taking/ Reflection	43	N.R.	N.R.	21.37 (7.8)	0.01

Quantitative Studies Using Post-test Design

Reference	***New or Validated Outcome***	***Outcome***	***Outcomes– Thematic Grouping***	***N***	***% agreement with outcome***
Goodrich TJ, *et al.*[45]	New	Usefulness of the training	• Satisfaction	48	79%
	New	Interest of the training	• Satisfaction	48	88%
Moss HA, *et al.*[59]	New	Satisfaction of training	• Satisfaction	27	99%
	New	Relevance of training to work	• Relevance to work	27	97%
Walker MR, *et al.*[65]	New	Total Satisfaction of course	• Satisfaction	32	89%
	New	Appropriateness of activities	• Satisfaction	32	94%
	New	Overall experience with instructors	• Satisfaction	32	97%

2B. Qualitative Evaluations – Well Described[b]

Reference	***Design***	***Timing***	***Methods***	***Outcome Improved – Thematic Grouping***
Arntfield SL, *et al.*[29]	Post-test	Immediate, 1.5 years later	Open-ended surveys; focus group	• Confidence/ Personal Accomplishment • Relevance to work
Balmer DF, Richards BF.[33]	Post-test	Immediate	Ethnography, content analysis, interviews	• Institutional impact • Pedagogical Skills • Relationship-building • Perspective-taking/Reflection
Birigwa SN, *et al.*[35]	Post-test	Immediate	Surveys	• Relationship-building • Resilience and burnout detection/mitigation • Perspective-taking/Reflection
Bobb SJ[36]	Post-test	Immediate	Ethnography, interviews	• Perspective- taking/Reflection • Relationship-building • Confidence/Personal accomplishment
Boudreau JD, *et al.* [37] *AND* Liben S, *et al.*[38]	Random-ized Step Wedge	Immediate	Interviews	• Narrative competence • Satisfaction
Brigley S, Jasper M[39]	Post-test	Immediate	Observation, focus groups, interviews	• Relationship-building • Perspective-taking/ Reflection

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Chretien KC, *et al.* [40] *AND* Chretien KC, *et al.*[41]	Post-test	Immediate	Focus groups, patient interviews	• Narrative competence, • Relationship-building, • Satisfaction
DasGupta S, *et al.* [42] *AND* Dasgupta S.[14]	Post-test	Immediate	Focus Groups, resident evaluations	• Cultural competence • Relationship-building • Empathy
Goodrich TJ, *et al.*[45]	Post-test	Immediate	Focus Group; program evaluation survey	• Empathy • Ethical inquiry • Narrative competence • Relationship-building
Gordon E.[46]	Post-test	Immediate	Content analysis of essays	• Resilience and burnout detection/mitigation
Goupy F, *et al.*[47]	Post-test	Immediate;	Open-ended survey	• Satisfaction
Gowda D, *et al.*[48]	Post-test	Not stated	Observation of sessions; interviews	• Relationship-building • Resilience and burnout detection/mitigation • Empathy
Holub PG.[51]	Post-test	Immediate	Focus Groups	• Empathy
Kennedy AJ, Sgro G. [54]	Post-test	Immediate	Open-ended survey	• Satisfaction
Murinson, B.[60]	Post-test	Immediate	Content analysis of responses	• Empathy • Ethical inquiry • Perspective-taking/Reflection
Polvani S, *et al.*[61]	Post-test	Immediate	Patient and family interviews; video recorded patient-doctor interactions, document review of letters of complaint	• Relationship-building
Small, *et al.* [70]	Post-test	1.5 year later	Interviews	• Relationship-building • Empathy • Resilience and burnout detection/mitigation
Spike J.[73]	Post-test	Immediate	Open-ended survey	• Satisfaction
Walker MR, *et al.*[65]	Post-test	Immediate	Open-ended survey	• Satisfaction
Winkel AF, *et al.*[67]	Post-test	Immediate	Questionnaire	• Satisfaction
Wohlmann A, Halstein M.[68]	Post-test	Immediate	Open-ended survey	• Satisfaction
Zohouri M.[69]	Post-test	Immediate	Content analysis of essays	• Empathy • Relationship-building • Perspective-taking/Reflection

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Notes: [a] All Quantitative Evaluations – Well Described report evaluation at the end of the program except for Winkel and Winkel AF.[21,66]. [b]See Appendix 2 for Outcomes/Findings.

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Table 3: Competencies Evaluated in Narrative Medicine Programs in Systematic Review[a]

Program Evaluation Outcomes	Quantitative, Well Described (n=7)	Qualitative, Well Described (n=21)
Participant Satisfaction	4	8
Relationship-building	0	11
Empathy	2	7
Perspective-taking/Reflection	1	5
Resilience & Burnout Detection/Mitigation	1	4
Confidence/ Personal Accomplishment	2	2
Narrative Competence	0	3
Relevance to Work	1	1
Pedagogical Skills	1	1
Ethical Inquiry	0	2
Cultural Competence	0	1
Institutional Impact	0	1

Notes: [a] Results of some evaluations were not well described, not mentioned, or not statistically significant. Thus, not all results in Appendix 2 are included in the descriptions of positive NM program outcomes discussed in the text of our review.

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Figure Legend

Figure 1. Record Search and Screening Process for Narrative Medicine Systematic Review, through 2017

PRISMA Checklist

Please see the attached PRISMA checklist.

Acknowledgements

Not applicable.

Authors' Contributions

Christy D. Di Frances, PhD, MA, Ellen Childs, PhD, John Carlo Pasco, MS, Ludovic Trinquart, PhD, David B. Flynn, MS(LIS), Sarah L. Wingerter, MD, Robina M. Bhasin, EdM, Lindsay B. Demers, PhD, MS, and Emelia J. Benjamin, MD, ScM have made substantial contributions to the manuscript materials as follows:

1. Engaging in the conceptualization and/or design of the work—or in the acquisition, analysis, and/or interpretation of data.
2. Drafting and/or critically revising the manuscript in regards to significant intellectual content.
3. Giving final approval to the version of the work submitted for publication.
4. Agreeing to be held accountable for all aspects of the work, including ensuring that any inquiries related to the accuracy and/or integrity of the work are appropriately investigated and resolved.

Competing Interests/COI Disclosures & Funding

The authors have no conflicts of interest in connection with this manuscript. This research was supported by the:

- National Institutes of Health (NIH) and the Food and Drug Administration (FDA) Center for Tobacco Products (CTP) Award Numbers P50HL120163 and U54HL120163
- NIH/NHLBI Award Numbers R01 HL128914, R01 HL092577, and R01 HL126136

- American Heart Association (AHA) Award Numbers 18SFRN34110082 and 18SFRN34150007
- Robert Wood Johnson Foundation: 'Studying mHealth technologies to help people improve their health and share their health information in real time with health care providers'
- Columbia University 2018-2019 Narrative Medicine Fellowship: 'Peer-led Narrative Medicine Workshops for First and Second Year Medical Students'($2,000 awarded to BU medical student John Carlo Pasco, co-author)

Data Sharing

Not applicable.

Patient Consent

Not applicable.

Patient and Public Involvement

Not applicable.

Ethical Approval

Not applicable.

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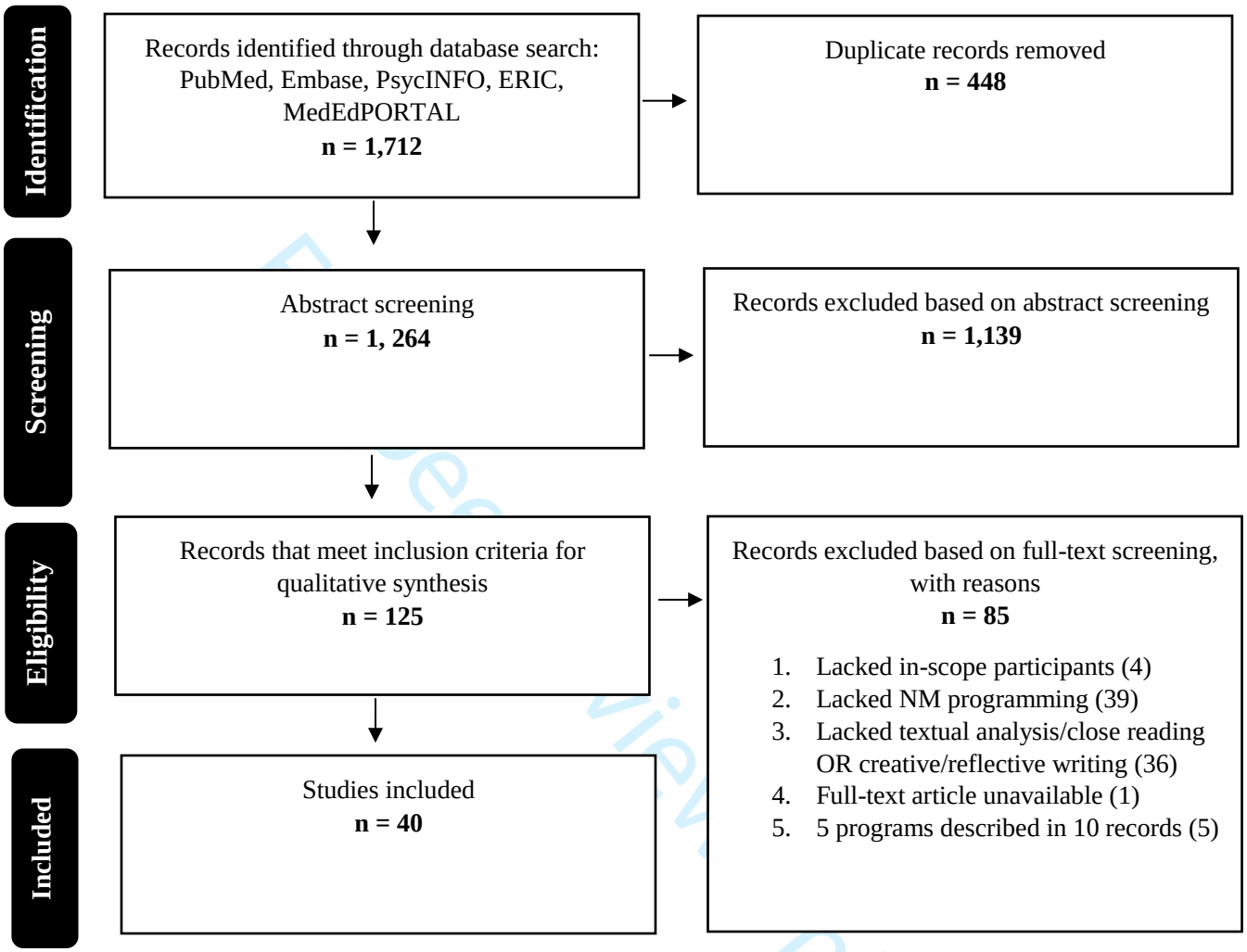
Figure 1. Record Search and Screening Process for Narrative Medicine Systematic Review, through 2017 [Mono Image]



Supplemental Digital Appendix 1. Literature Database Search for Narrative Medicine Systematic Review, through 2017

Database	Search Terms	Results	Duplicates	Original Citations
PubMed	"narrative medicine"[all fields] OR "reflective writing"[all fields]	456	4	452
Embase	"narrative medicine"/exp OR "narrative medicine" OR "reflective writing"	593	321	272
PsycINFO	TX narrative medicine OR TX reflective writing	497	107	390
ERIC	"narrative medicine"	13	6	7
MedEdPORTAL	"narrative"	98	1	97
MedEdPORTAL	"reflective"	55	9	46
TOTAL		1,712	448	**1,264**

Supplemental Digital Appendix 2. Outcomes/Findings for Qualitative – Well Described Evaluations (a Supplemental to Table 2B)

Reference	Outcomes/Findings	Outcome Improved – Thematic Grouping
Arntfield SL, *et al*.(1)	Confidence in effectiveness of future as physicians	• Confidence/ Personal Accomplishment • Relevance to work
Balmer DF, Richards BF.(2)	Qualitative themes that emerged: 1) Teaching skills and personal growth; 2) Impact on Interpersonal relationships; 3) impact on the institution	• Institutional impact • Pedagogical Skills • Relationship-building • Perspective-taking/Reflection
Birigwa SN, *et al*.(3)	"…NM workshops help with coping with stress, give time to relax and self-reflect, and increase positive physician/patient engagement."	• Relationship-building • Resilience and burnout detection/mitigation • Perspective-taking/Reflection
Bobb SJ(4)	"…Building stronger relationships as they grew more aware of each other's stories and had the opportunity to reflect on their work among their coworkers…. intensified individual and team understanding of their roles as healthcare professionals…this process positively contributed to their individual and shared identity, value, and meaning as a nurse."	• Perspective-taking/Reflection • Relationship-building • Confidence/Personal accomplishment
Boudreau JD, *et al*. (5) *AND* Liben S, *et al*.(6)	"The written comments were invariably supportive… The most prevalent specific recommendations revolved around ensuring that in future workshops everyone should be accorded the opportunity to share stories… A second cluster of recommendations had to do with the quality of the writing triggers" "…the majority of study participants already use a form of narrative in their teaching … those who attended displayed a more nuanced understanding of narrative as revealed by their (appropriate) use of specific narrative medicine descriptors."	• Narrative competence • Satisfaction
Brigley S, Jasper M(7)	"…improved educational understanding and multidisciplinary awareness among its participants. Refinements of the programme were identified…"	• Relationship-building • Perspective-taking/Reflection
Chretien KC, *et al*. (8) *AND* Chretien KC, *et al*.(9)	Qualitative analysis resulted in four themes: patient experience, student experience (and student learning), student-patient dynamic, and challenges. 'Students' stories showed attainment of narrative competence.'	• Narrative competence, • Relationship-building, • Satisfaction
DasGupta S, *et al*. (10) *AND* DasGupta S.(11)	"…all participants believed the activity helped them learn about the importance of recognizing cultural differences." "...the medical residents reported a variety of intentions to change their attitudes and behaviors including an intention to be more sensitive to cultural differences and more patient and to recognize their biases and the effect of those biases on caregiving."	• Cultural competence • Relationship-building • Empathy
Goodrich TJ, *et al*.(12)	Findings from the Focus Groups: 1) relevance of narratives in ethical decision making, 2) empathic connection that was achieved through narrative understanding as necessary for producing ethical behavior, 3) ways to nurture insights regarding contextualizing their patients. Findings from the program evaluations: 1) More holistic way of looking at patients (beyond just the illness), 2) recognition of how physicians' values enter into clinical decision making	• Empathy • Ethical inquiry • Narrative competence • Relationship-building

Reference	Outcomes/Findings	Outcome Improved – Thematic Grouping
Gordon E.(13)	"Of [the 39 essays analyzed], 13 (33%) contained statements concerning for burnout." The authors conclude that, "Narrative medicine can be a powerful tool for identifying signs of burnout among Internal Medicine residents. In addition, sharing of patient stories in groups can help trainees to reflect the commonality of challenging patient experiences, which might mitigate feelings of burnout."	• Resilience and burnout detection/mitigation
Goupy F, *et al*.(14)	Satisfaction with program	• Satisfaction
Gowda D, *et al*.(15)	"… team members across the disciplines and levels of educational attainment are open to active participation in sessions… team members speak of strengthening attention, valuing creativity, and enhancing relationships."	• Relationship-building • Resilience and burnout detection/mitigation Empathy
Holub PG.(16)	Confirmed quantitative findings that participants' rates of empathy was greater than non-participants.	Empathy
Kennedy AJ, Sgro G. (17)	Satisfaction with program; suggestions for improvement	Satisfaction
Murinson, B.(18)	"Qualitative analysis revealed that: emotional suffering, (e.g., isolation, heartache, etc.) is nearly universal for students at this stage, while physical pain is not; distinguishing physical pain from psychological or social suffering was initially difficult for some students, but the majority improved in this capacity; and that students were challenged to define their own values which served to enhance awareness of other's value systems."	• Empathy • Ethical inquiry Perspective-taking/Reflection
Polvani S, *et al*.(19)	Doctor-patient Relationships	• Relationship-building
Small, *et al*. (20)	"…narrative medicine can play a role in building community among diverse health care providers and promoting self-care."	• Relationship-building • Empathy Resilience and burnout detection/mitigation
Spike J.(21)	Satisfaction with program components	• Satisfaction
Walker MR, *et al*.(22)	Satisfaction and organization of program; the climate, content and leadership of the teachers was the most valued aspects of the program. The number of sessions and activities was reported as insufficient. Participants offered suggestions for improving the program.	• Satisfaction
Winkel AF, *et al*.(23)	Satisfaction with program. Residents found it enjoyable, felt more calm/clear headed and satisfied with their daily work. One resident said the writing was difficult. Described reasons for non-attendance.	• Satisfaction
Wohlmann A, Halstein M.(24)	Satisfaction; program helped to understand the patients as humans and that interpretation is important to interaction	• Satisfaction
Zohouri M.(25)	"…Three major categories in students' reflection on reading Death of Ivan Ilych as an end of life human body… 1) Emotional experience, 2) Empathy and effective communication, 3) Spirituality and dignity…this reflection activity may help medical students have a deeper idea of the end of life situation and feelings."	• Empathy • Relationship-building Perspective-taking/Reflection

Supplemental Digital Appendix 3. Records included in Narrative Medicine Systematic Review

Authors	Publication Year	Publication Type	Program Location	Number of Participants	Participant Constituency	Program Goals	Number of Sessions	Hours in Program	Program Activities	Program Evaluation
Arntfield, *et al.*(1)	2013	Article	New York, NY, USA	12	Medical students	To explore the influence of NM training on fourth-year medical students' clinical skills, including communication, collaboration, and professionalism.	4	10	Faculty facilitators used readings as a basis for discussion about illness and patient care, and to introduce reflective writing exercises. Participants responded to writing prompts and shared their narratives with the group.	Qualitative – Well Described
Aronson L, Schwalbe W.(26)	2015	Abstract	Philadelphia, PA, USA	N/S	N/S	To foster writing for wellness, advocacy, or education and to facilitate the publication of writing by healthcare professionals	1	N/S	A discussion of different modes of writing by healthcare professionals and the varied purposes of such writing. Publication strategies and venues were discussed. Participants wrote in class and received peer feedback from colleagues in a small group format.	None/Not Specified
Ball SC(27)	2011	Abstract	New York, NY, USA	N/S	Medical students	To support medicine sub interns through training in reflective writing and narrative competence	N/S	N/S	Reflected on sub internship experience, read and discussed texts, offered their perspectives on writing content and style, responded to a writing prompt, and shared their narratives.	None/Not Specified
Balmer, *et al.*(28)	2016	Abstract	Houston, TX, USA	8	Medical students, residents, faculty	To assess the feasibility of integrating NM training into clinical rotations	12	60	Engaged in literary analysis, small group discussions, and writing workshops. They also submitted a piece of writing for workshopping.	Qualitative—Incomplete Description
Balmer DF, Richards BF(2)	2012	Article	New York, NY, USA	25	Faculty	To implement a faculty development program that employed foundational tenants of NM (reading and reflection) as a means towards fostering behavioral and social sciences in medical education	N/S	N/S	Read and discussed published narratives to enhance their teaching competencies. They also generated reflective writing for the purpose of telling stories about themselves, their students, and their patients.	Qualitative – Well Described

Authors	Publication Year	Publication Type	Program Location	Number of Participants	Participant Constituency	Program Goals	Number of Sessions	Hours in Program	Program Activities	Program Evaluation
Bhavaraju VL, Miller S(29)	2014	Article	Phoenix, AZ, USA	12	Faculty	To guide residents in using reflective writing to process emotions, reactions, and motivations related to their professional lives	12	24	Opening writing prompt, discussion of doctor-patient related themes in literary pre-readings, and sharing of personal narratives.	Quantitative – Well Described
Birigwa, *et al.*(3)	2017	Abstract	New York, NY, USA	16	Residents	To employ NM for the promotion of wellbeing, self-care, mindfulness, and empathy in pediatric residents	4	4	Discussion of literature, reflective writing, art, and spirituality. Motifs explored included: self-care, narrative humility, illness, death, and giving bad news.	Qualitative – Well Described
Bobb SJ(4)	2017	Thesis	Milwaukee, WI, USA	11	Nurses	To assess the impact of NM practices on the teamwork and professional identity of NICU nurses	3	N/S	Read and discussed a narrative, followed by free-writing time based on a prompt, and sharing. Group narrative sessions were followed by semi-structured, one-on-one interviews. Finally, participants were observed while working in the NICU.	Qualitative – Well Described
Boudreau, *et al.* (5) AND Liben, *et al.*(6)	2012	2 Articles	Montreal, Canada	~ 92	Faculty	To introduce narrative theory, practice reflective writing, and discuss strategies for integrating reflective exercises into an apprenticeship.	1	3	Workshops included a didactic component as well as literary and writing exercises to develop skills in narrative and reflection.	Quantitative – Incomplete Description, Qualitative – Well Described
Brigley S, Jasper M(7)	2010	Article	Cardiff, Wales, UK	22	Faculty, trainees, administrators/staff	To develop a highly functioning, multidisciplinary faculty of practitioners in surgery operating theaters	6	36	Involved reading, reflective writing and portfolio-building for professional development in surgery faculty, trainees, and staff.	Qualitative – Well Described

Authors	Publication Year	Publication Type	Program Location	Number of Participants	Participant Constituency	Program Goals	Number of Sessions	Hours in Program	Program Activities	Program Evaluation
Chretien KC, *et al.*(8, 9)	2014, 2015	Abstract & Article	Washington D.C., USA	47	Medical students	To develop narrative competence, foster attentive listening, and promote reflection with the broader goal of empathy-formation for better patient care and improved outcomes	3	N/S	Introduced NM concepts, including a paired storytelling and listening exercise; students attentively listen to and record patient narratives of illness, and to read these back to the patients. Students also worked with patients to choose artwork to effectively represented their story; wrote reflectively about their experiences.	Qualitative – Well Described
DasGupta(11) & DasGupta , *et al.(10)*	2006	2 Articles	New York, NY, USA	~20	Resident, faculty, para-medical workers, other staff	To foster cultural competence and effective, empathic communication through a literary case study, with the aim of improving patient care	13	N/S	Sessions opened with questions about the text and conversation to discuss themes relevant to the novel, including intercultural communication, healthcare practices, and relating to chronically ill and/or dying patients.	Qualitative – Well Described
Elliott *et al.*(30) & Schaff P(31)	2006 & 2010	Article & Curriculum	Los Angeles, CA, USA	N/S	Medical students	To explore clinical skills that foster empathy and recognize the significance of narrative in relation to patients' stories, reflective writing, and appreciating vulnerability. To apply narrative competence and reflective practice skills to the clerkship experience.	1	2	Storytelling, followed by 30 minutes of discussion about the literary pre-readings, then reflective writing followed by time for sharing their narratives. Assignments included online weekly journal entries and a narrative project for the final session.	Quantitative – Incomplete Description, Qualitative— Incomplete Description

Authors	Publication Year	Publication Type	Program Location	Number of Participants	Participant Constituency	Program Goals	Number of Sessions	Hours in Program	Program Activities	Program Evaluation
Goodrich, *et al.*(12)	2005	Article	New York, NY, USA & Houston, TX, USA	48	Residents	To foster comprehension of and appreciation for the narrative basis of medicine, the ethical dimension of medical encounters, the intersection between social context and clinical decision-making, and the employment of narrative to inform decision making.	4	16	The sessions included: demonstration of the narrative aspect of clinical encounters, demonstrated the application of narrative analysis principles to medical narratives; presentations about patients and the medical chart as a form of written reflection, time to practice writing narratives; analyzed stories written by participants; demonstrated the significance of ethics and values as conveyed by narrative, discussed their learning in the program.	Quantitative – Well Described, Qualitative – Well Described
Gordon E(13)	2017	Abstract	Newark, NJ, USA	43	Residents	To identify and alleviate burnout and to foster resilience.	1	N/S	Reading a NM piece, submitting writings about meaningful patient encounters.	Qualitative – Well Described
Goupy, *et al.*(14)	2013	Article	Paris, France	41	Medical students	To teach narrative and emphasize the significance of listening and writing to better observe/interpret patients' stories and improve the doctor-patient relationship.	6	20	Included sessions on: definition of NM and ice breakers for group formation, viewing a film and related discussion, a narrative writing exercise focused on participants' stories of personal or family illness, the theme of empathy in the doctor-patient relationship, the connection between art and medicine, and an overarching discussion about uses of NM.	Quantitative – Well Described, Qualitative – Well Described
Gowda, *et al.*(15)	2017	Abstract	New York, NY, USA	~65	Residents, faculty, nurses, staff	To utilize NM in clinical settings for enhancing interprofessional education and practice while reducing burnout	40	20	Discussion of published narratives, reflective writing exercises, and peer sharing of written pieces.	Quantitative – Incomplete Description, Qualitative – Well Described

Authors	Publication Year	Publication Type	Program Location	Number of Participants	Participant Constituency	Program Goals	Number of Sessions	Hours in Program	Program Activities	Program Evaluation
Heller EA, Heller FE(32)	2016	Abstract	New York, NY, USA	N/S	Care-givers, staff, patients	To support patients and improve communication and understanding among patients, staff, and caregivers	N/S	N/S	Literature and writing are employed to foster discussion. Patients write their stories as a means of gaining a sense of autonomy over their medical trajectories. The workshop creates a trust-based community, fostering communication among caregivers, staff, and patients coping with chronic illness.	None/Not Specified
Heller-stein DJ(33)	2015	Article	New York, NY, USA	~192	Medical students	To train more effective doctors by helping preclinical medical students to engage with humanities education	6	18	Close readings and discussion of literary narratives and in-class writing assignments. Participant writings are peer-edited and re-written before submission.	None/Not Specified
Holub PG(16)	2011	Thesis	Fort Lauderdale, FL, USA	44	Students (doctoral-level health sciences)	To assess affective development of medical professionalism through online NM programming	12	12	Compared 2 programs on medical ethics and professionalism. Control involved used traditional, problem-based learning activities. Treatment involved relevant literary and multimedia narratives to supplement the text-based case studies.	Quantitative – Well Described, Qualitative – Well Described
Hurst M, Irvine C(34)	2014	Book chapter	New York, NY, USA	15-18	Students in NM master's program (including medical providers)	To positively alter attitudes about death, dying, and end-of-life-care by facilitating interdisciplinary discourse (e.g. among healthcare professionals, writers, philosophers, artists)	N/S	N/S	Discussions based on literature and film. Participants practice preparing and teaching NM lessons like what they might use in future medical education. The final assignment is a genre or media analysis focused on storytelling to understand death and dying.	None/Not Specified

Authors	Publication Year	Publication Type	Program Location	Number of Participants	Participant Constituency	Program Goals	Number of Sessions	Hours in Program	Program Activities	Program Evaluation
Jacobs ZG(35)	2017	Abstract	Pittsburgh, PA, USA	N/S	Medical students, residents, faculty	To develop a sustainable, collaborative NM workshop for fostering narrative competence and empathy, as well as for promoting well being among healthcare professionals	8	8	Explored medically-related themes by cultivating narrative competence, with a focus on literary close reading/textual analysis; reflective writing/storytelling; and interpreting art, film, and photography. Participants had the opportunity to engage in an online forum, where literary excerpts and reflective writing prompts were posted.	Quantitative – Incomplete Description
Kennedy AJ, Sgro G(17)	2016	Abstract	Pitts-burgh, PA, USA	7	Medical students, residents, faculty	To use creative nonfiction to help residents consider other perspectives, thus providing enhanced care for patients from underserved populations	4	N/S	Completed pre-readings and interviewing one of their patients at a clinic for underserved populations; they later wrote about patients. Workshops focused on narrative themes. Sessions included discussions of the pre-readings and writing to prompts, and the opportunity for participants to read their stories and receive peer feedback.	Qualitative – Satisfaction Only
Kissler, *et al.*(36)	2016	Article	Houston, TX, USA	17	Medical students	To explore how medical students' narrative reflections about their experiences in the anatomy lab might display themes relevant to professional identity formation	1	1	Read two narratives and then wrote to related prompts. Writing time was followed by a group exercise in which students had the opportunity to read their narratives and engage in discussion with peers.	None/Not Specified
Lane-Retickeer A, Fogel C(37)	2012	Abstract	Hartford, CT, USA	5	Physicians	To discuss the significance of the humanities in career development in Hospice and Palliative Medicine and overall physician wellness	N/S	N/S	Read poetry and (sometimes) perspectives pieces from medical journals, and engaged in reflective writing. By turns, participants facilitate the discussion. Also went to a local art museum and watched a film with an end-of-life theme.	None/Not Specified

Authors	Publication Year	Publication Type	Program Location	Number of Participants	Participant Constituency	Program Goals	Number of Sessions	Hours in Program	Program Activities	Program Evaluation
Machado MC, Lobo Antunes J(38)	2016	Article	Lisbon, Portugal	12	Medical students	To develop narrative competence, learn communication strategies, interpret and understand illness narratives, and cultivate reflective practice	N/S	23+	Reading literary texts, reflective dialogue, and reflective writing were employed during the theoretical component to facilitate discussion of various themes.	None/Not Specified
Mark, *et al.*(39)	2017	Abstract	Phoenix, AZ, USA	N/S	Nurses	To define and explain the theory and practice of NM, and to demonstrate how NM skills can help increase empathy and understanding for better patient care	1	1	The program introduced NM theory, methods, applications, and tools to promote trainee self-care, with a particular focus on secondary trauma.	None/Not Specified
Moss, *et al.*(40)	2014	Abstract	New York, NY, USA	27	Resident, fellows	Created and implemented an NM program to reduce burnout and increase empathy and perceptions of service culture	4	N/S	NM workshops were introduced into protected, didactic time slots. Sessions employed literature (poetry and short stories) and made time for reflective writing and group discussion to explore themes and issues.	Quantitative – Well Described
Murinson B(18)	2010	Curriculum	Baltimore, MD, USA	N/S	Medical students	To approach pain and suffering through the lens of the humanities as a means of encouraging emotional growth, developing empathy, and fostering professional value formation regarding the ethics of dealing with pain	4	8	Encouraged participants to reflect and discuss experiences of and responses to pain to foster emotional growth and develop empathy.	Quantitative – Incomplete Description, Qualitative – Well Described
Polvani, *et al.*(19)	2014	Article	Florence, Italy	70	Physicians, nurses, paramedical workers, administrators/staff	To enhance NM awareness among health professionals as a means of improving quality of care	N/S	N/S	Interviewed patients about their illness to identify critical issues. Used focus groups, theater, poems, and video recorded conversations to assess both verbal and nonverbal communication to improve doctor–patient relationships and explore communication.	Qualitative – Well Described

Authors	Publication Year	Publication Type	Program Location	Number of Participants	Participant Constituency	Program Goals	Number of Sessions	Hours in Program	Program Activities	Program Evaluation
Robeson R, King NMP(41)	2017	Article	Chapel Hill/Wake Forest, NC, USA	N/S	Medical students, graduate bioethics students (including health professionals)	To cultivate reflection and discussion related to bioethics.	N/S	N/S	Course sessions can be subdivided into three phases: discussion and analysis, research, and writing of the performable case studies (PCS).	None/Not Specified
Roy R(42)	2007	Article	Chicago, IL, USA	N/S	Medical students	To use literature and reflective writing as a means of teaching cultural competence, communication, and sensitivity	4	N/S	As pre-work, participants reviewed reflective readings based on session themes and wrote short reflective narratives. In-class time included literary analysis, discussion, and reflective writing.	Qualitative—Incomplete Description
Shankar PR(43)	2009	Article	Pokhara, Nepal	26	Medical students, faculty	To promote the advantages of the medical humanities for medical students and physicians	13	N/S	Small-group sessions included literary and art analysis, reflective writing, group discussion, role play, case studies, and debates for exploring medical humanities.	Qualitative—Incomplete Description
Small LC, *et al.*(20)	2017	Article	Baltimore, MD, USA	126	Medical students, resident, fellows, faculty, nurses, nursing students, paramedical worker, administrators/staff	To foster empathy, reflective practice, and interdisciplinary community-building among clinicians and hospital staff	18	N/S	Each session included discussion of literary readings, reflective writing based on a prompt, and sharing of participant writings.	Qualitative – Well Described
Spike J(21)	2008	Curriculum	Houston TX, USA	N/S	Medical students	To employ narrative to discuss professionalism, problem solving, and work-life balance	1	3	Pre-readings were assigned well in advance and facilitators led small-group sessions (<10 students). The session also allowed time for a short reflective writing exercise.	Quantitative – Incomplete Description, Qualitative – Satisfaction Only

Authors	Publication Year	Publication Type	Program Location	Number of Participants	Participant Constituency	Program Goals	Number of Sessions	Hours in Program	Program Activities	Program Evaluation
Walker, *et al.*(22)	2012	Article	Santiago, Chile	36	Faculty	To experiment with literary texts and writing techniques in medical education as a means of awakening creativity and facilitating reflection	6	12	Sessions included reading and reflecting on literary texts, writing, sharing, and discussing participants' narratives. At the end of the course, each participant presented a narrative to be evaluated by peers and teachers according to: theme, character(s), context, development (conflict and/or transformation), and writing technique.	Quantitative – Well Described, Qualitative – Satisfaction Only
Winkel (44) & Winkel, *et al.*(45)	2016	Article & Curri-culum	New York City, NY, USA; Chicago, IL, USA; Burlington, VT, USA	66 [43 evaluated]	Residents	To determine if an NM curriculum can reduce burnout. To train residents in reflecting on and processing their own and their patients' experiences	15	15	Used literary narratives to foster discussion focused on relevant themes. Reflective writing prompts and time for sharing participant narratives were also integrated into the curriculum.	Quantitative – Well Described
Winkel AF, *et al.*(23)	2010	Article	New York City, NY, USA	20	Residents	To reduce burnout and enhance empathy through NM and reflection	6	6	Sessions opened with reading and discussing fiction. Writing prompts were used to generate narratives in class. Participants were encouraged to read their writings to the group and invite feedback in an atmosphere of confidentiality.	Quantitative – Incomplete Description, Qualitative – Satisfaction Only
Wohlmann A, Halstein M(24)	2016	Article	Mainz, Germany	9	Medical students	To use texts and art for fostering observational skills, developing an understanding of complex illness narratives, and appreciating diverse interpretations	6	7.5	Participants engaged in close reading short stories, poems, and novels with medical motifs. Discussion included analysis of effective literary techniques and meaning. Participants engaged reflective writing and subsequent peer workshopping.	Quantitative – Incomplete Description, Qualitative – Satisfaction Only

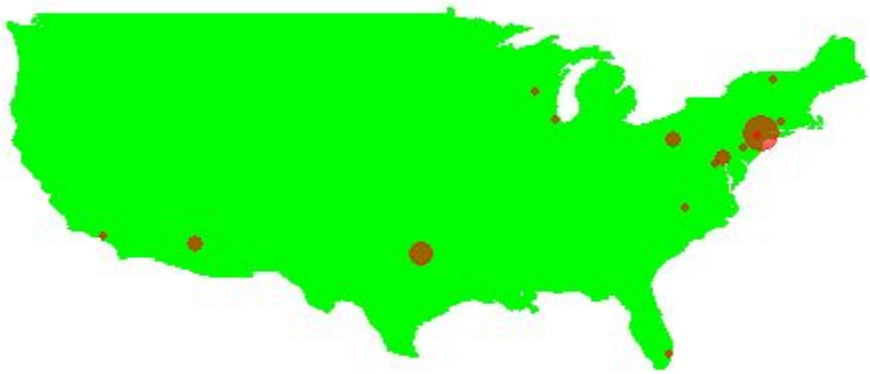
Authors	Publication Year	Publication Type	Program Location	Number of Participants	Participant Constituency	Program Goals	Number of Sessions	Hours in Program	Program Activities	Program Evaluation
Zohouri, *et al*(25).	2017	Article	Shiraz, Iran	350	Medical students	To use a literary narrative to foster reflection on end-of-life issues	1	2	Used the Kolb four-stage experiential model to write reflectively about their thoughts on a novella.	Qualitative – Well Described

[a] Abbreviations: N/S – Not specified; N/A – Not applicable

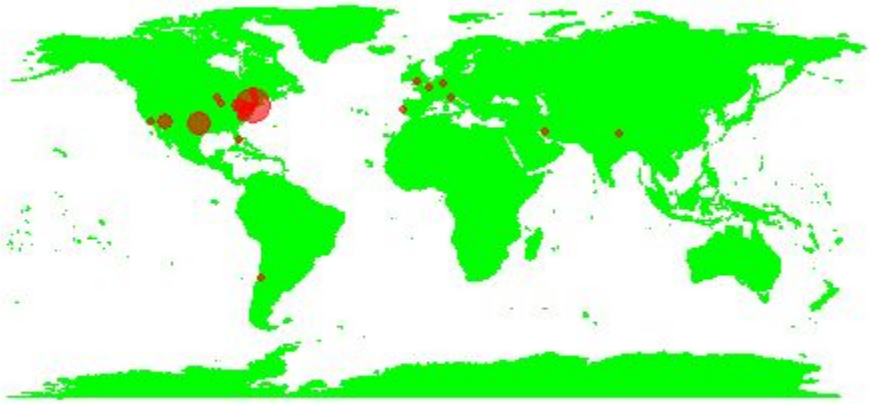
[b] Results of evaluations were not mentioned in the abstract; thus, these results have not been included with the descriptions of positive NM program outcomes discussed in the text of our review.

[c] Results were not statistically significant; thus, these results have not been included with the description of positive NM program outcomes discussed in the text of our review.

Supplemental Digital Appendix 4. Locations of Programs Included in Narrative Medicine Systematic Review



United States of America



World

Supplemental Digital Appendix 5. Quantitative and Qualitative Incomplete Evaluation Descriptions of Narrative Medicine Programs in Systematic Review[1]

Quantitative – Incomplete Description			
Reference	***Outcome–new or validated measure***	***Outcome(s)***	***Rationale for determining incomplete evaluation***
Boudreau, *et al.* AND Liben S, *et al.*(5, 6)	New	Narrative Skills Assessment Tool	Authors report no consistent differences in responses between attendees and non-attendees. Scores not reported.
Elliott D, *et al*. AND Schaff P.(30, 31)	New	1) satisfaction with workshop, 2) usefulness of workshop in enhancing perspectives about some of the guiding principles of Family Medicine, 3) value of the session	The percent agreement was reported, but not the total N or the actual wording of the evaluation questions
Gowda D, *et al.*(15)	Validated	Maslach Burnout Inventory, UtrectWork Engagement Score, Team Development, Interpersonal Reactivity	"At baseline, scores for burnout were higher for attending physicians, while scores for other instruments were comparable. Pre-post differences will be available by conference date."
Jacobs ZG, Sgro G.(35)	Validated	Maslach Burnout Inventory, Toronto Empathy Questionnaire, Interpersonal Reactivity	"The outcome of the workshop is yet to be determined, but the hope is to demonstrate that our curriculum improves participant empathy and sympathy while reducing burnout."
Murinson, B.(18)	New	Effectiveness of pain narratives on augmenting awareness of the nuances reality of pain	Authors report general high-level results in narrative. Quantitative results not reported.
Spike J.(21)	New	Satisfaction with training	Line graphs of distributions are provided for each measure as an attachment for two rounds of the training; Ns are not provided.
Winkel AF, *et al.*(23)	Validated	Maslach Burnout Inventory, Interpersonal Reactivity	"The results were not examined for quantitative trends because the numbers of participants were too small for relevant statistical analysis."
Wohlmann A, Halstein M.(24)	New	satisfaction and relevance of course to future work	Reported in text the N of particular response categories, but not of the entire scale; unable to document the full evaluation findings from what is presented in narrative.
Qualitative – Incomplete Description			
Balmer, *et al.*(28), Elliott D, *et al*. *AND* Schaff P. (30, 31), Roy R(42), Shankar PR(43)			
None/Not Specified			
Aronson L, Schwalbe W.(26), Ball SC(27) Heller FE(32), Hellerstein DJ(33), Hurst M, Irvine C(34), Kissler, *et al.*(36), Lane-Reticker A, Fogel C(37), Machado MC, Lobo A J(38), Mark, *et al.*(39), Robeson R, King NMP(41)			

[1] All Quantitative Evaluations – Well Described report evaluation at the end of the program except for Elliott D, *et al*. and Schaff P. 30. Elliott D, Schaff P, Woehrle T, Walsh A, Trial J. Narrative Reflection in Family Medicine Clerkship - Cultural Competence in the Third Year Required Clerkships. MedEdPORTAL. 2010;6(1153), 31. Schaff P. Donning the White Coat: The Narrative Threads of Professional Development. J LearnThrough the Arts. 2006;2(1):21. and Gowda D, et al.(13), which do not specify timing.

Supplemental Digital Appendix 6: Basic Checklist for Designing, Implementing, Evaluating, and Disseminating a Narrative Medicine Program in Academic Medicine/Health Sciences

Program Design

Identify participant constituency

- ❑ Allied Health Professionals
- ❑ Faculty (clinical, research)
- ❑ Graduate Health Sciences Students
- ❑ Medical Students
- ❑ Nurses
- ❑ Nursing Students
- ❑ Physician Non-Faculty
- ❑ Residents/Fellows
- ❑ Staff
- ❑ Other

Conduct a needs assessment with target constituency

- ❑ Perceived Narrative Interest
- ❑ Perceived Narrative Needs

Identify target goals and outcomes

- ❑ Burnout Detection/Mitigation
- ❑ Clinical Competence
- ❑ Confidence/Self-efficacy
- ❑ Empathy/Sympathy
- ❑ Medical Team Functioning
- ❑ Narrative Competence (including Attentive Listening)
- ❑ Participant Satisfaction
- ❑ Pedagogy Skills
- ❑ Perspective-taking
- ❑ Professionalism/Vocation
- ❑ Relationship Building
- ❑ Reflection
- ❑ Relevance to Work
- ❑ Resilience
- ❑ Wellness
- ❑ Writing Skills
- ❑ Other

Identify program timeline and session format

- ❑ Timeline
- ❑ Session Format (e.g. frequency, length)

Identify activities that will best support the achievement of specified goals and outcomes

- ❑ Group Discussion
- ❑ Group Reading
- ❑ Individual Reading
- ❑ Reflective Writing Exercises
- ❑ Sharing of In-Class Writing
- ❑ Writing Workshop
- ❑ Other

Create curriculum in accordance with selected goals and activities

- ❑ Principles of Adult Education
- ❑ Other

Formulate an evaluation methodology to best measure overall effectiveness

- ❑ Qualitative
- ❑ Quantitative
- ❑ Mixed Methods

Formulate an evaluation strategy for implementation

- ❑ Formative
- ❑ Pre/Post Summative
- ❑ Short-term
- ❑ Long-term

Consider theory of change in program design

Program Implementation

Organize logistics

- ❑ Venue
- ❑ Materials
- ❑ Food
- ❑ Other

Recruit participants

- ❑ Direct Email
- ❑ Institution-wide/Departmental Newsletters
- ❑ Word of Mouth
- ❑ Other

Distribute pre-work to participants in advance of each session

- ❑ Literary Pre-readings
- ❑ Participant-generated Narratives for Workshopping

Program Evaluation

Assess according to pre-determined evaluation strategy

- ❑ Pre-/post- program summative evaluations
- ❑ Formative evaluation at conclusion of sessions
- ❑ Short-/long-term evaluations
- ❑ Other

Map target goals to outcomes to assess effectiveness

- ❑ Attentive Listening
- ❑ Burnout Detection/Mitigation
- ❑ Clinical Competence
- ❑ Confidence/Self-efficacy
- ❑ Empathy/Sympathy
- ❑ Medical Team Functioning
- ❑ Narrative Competence
- ❑ Participant Satisfaction
- ❑ Pedagogy Skills
- ❑ Perspective-taking
- ❑ Professionalism/Vocation
- ❑ Relationship Building
- ❑ Reflection
- ❑ Relevance to Work
- ❑ Resilience
- ❑ Wellness
- ❑ Writing Skills
- ❑ Other

Program Dissemination

Identify suitable format

- ❑ Book Chapter
- ❑ Conference Presentation
- ❑ Curriculum
- ❑ Journal Article

Identify suitable target venue

- ❑ Conference
- ❑ Journal
- ❑ Website
- ❑ Other

Include relevant program details for successful replication at other institutions

- ❑ Conceptualization
- ❑ Scope
- ❑ Design
- ❑ Goals
- ❑ Activities
- ❑ Curriculum
- ❑ Evaluation Methodology
- ❑ Evaluation Results

Submit to target venue

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PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2-4
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	6-7
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	7-8
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	N/A
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	8-9
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	9-10; Appendix
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	9-10; Appendix
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	10-12
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	10-12
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	10-12
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	10-12
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	10-12
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	10-12

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Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	10-12
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	10-12
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	Figure 1; Table 1
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	12-17; Tables; Appendix
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see Item 12).	12-17; 24-25; Tables; Appendix
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	12-17; Tables; Appendix
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	12-17; Tables
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	12-17; 24-25
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	12-17
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	17-23
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	24-25
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	25-26
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	35

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

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