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Futures Studies Approaches in Medical Education: A BEME Systematic Review: BEME Guide No. 52.

Background: It is over 50 years that the introducing of futures studies has been started; however, the number of such studies in medical education seems to be very limited. Familiarization with futures studies can have a positive effect on the application of these studies in medical education as well. The present study was performed to Review and synthesize the best existing evidence in the literature that addresses the question, "What are the most effective futures studies approaches in medical education"?

Methods: Based on Best Evidence Medical Education (BEME) guidelines, a review of PubMed, Scopus, Educational Resource Information Center, Web of Science, and Google Scholar (1976–2019), was conducted with the search strategy of "futures studies" OR "future studies", "Medical education", and "approach OR method". Hand searching and grey literature search were also used. According to inclusion criteria, all abstracts and papers were screened by pairs of reviewers. Using the presage process product (3P) model, analyzing and synthesizing the included studies were performed.

Results: From screening 1533 abstracts, 7 articles met the inclusion criteria. A wide range of futures studies methods have been introduced for medical education, but the most commonly used methods were different types of scenarios.

Conclusion: Using different forms of scenario was the most used method in future studies in medical education. The variety and breadth of future studies in medical education call for a more specific and limited number of methods to be undertaken in this field.

Keywords: Futures studies, Approach, Medical education, BEME

مناهج الدراسات المستقبلية في التعليم الطبي: مراجعة منهجية بناءً على دليل BEME: BEME رقم 52

الخلفية والهدف: بعد أكثر من 50 سنة من تعريف الدراسات المستقبلية، فإن استخدام هذه الدراسات في التعليم الطبي محدود جداً. التعرف على الدراسات المستقبلية يمكن أن يكون لها تأثير إيجابي على استخدام هذه الدراسات في التعليم الطبي. كان الغرض من هذه الدراسة هو مراجعة وجمع أفضل الأدلة المتوفرة في مراجعة الأدبيات والإجابة على السؤال: "ما هي أكثر طرق الدراسات المستقبلية المؤثرة في التعليم الطبي؟"

الطريقة: استناداً إلى دليل "BEME" (أفضل دليل على التعليم الطبي) استعرض المتون باستخدام PubMed و Scopus و Eric و Web of Science و Google Scholar وباستراتيجية البحث ("الدراسات المستقبلية" أو "الدراسات"، "المستقبل"، "التعليم الطبي" و"النهج أو الطريقة"). يتم إجراء البحث اليدوي والبحث عن الموارد الرمادية أيضاً واستعرض جميع الملخصات والمقالات من قبل اثنين من المحكمين وفقاً لمعايير الإدرج. تم تحليل مختلف الدراسات وتوليفها باستخدام نموذج المنتج عملية (3P) presage.

النتائج: من عرض 1533 ملخصات، حققت 7 مقالات معايير الاشتمال. تم تقديم مجموعة واسعة من أساليب الدراسات المستقبلية للتعليم الطبي، ولكن الأساليب الأكثر استخداماً كانت أنواعاً مختلفة من السيناريوهات.

الاستنتاج: كان استخدام أشكال مختلفة من السيناريو هو الطريقة الأكثر استخداماً في الدراسات المستقبلية في التعليم الطبي. إن تنوع واتساع الدراسات المستقبلية في التعليم الطبي يستدعي عدداً أكبر وأكثر تحديداً من الأساليب التي يجب القيام بها في هذا المجال.

الكلمات المفتاحية: الدراسات المستقبلية، المنهج، التعليم الطبي، BEME

رویکردهای مطالعات آینده پژوهی در آموزش پزشکی: یک مرور سیستماتیک بر اساس راهنمای BEME: BEME شماره 52

زمینه و هدف: با گذشت بیش از 50 سال از معرفی مطالعات آینده پژوهی، موارد استفاده از این مطالعات در آموزش پزشکی بسیار محدود است. آشنایی با مطالعات آینده پژوهی می تواند تأثیر مثبتی بر کاربرد این مطالعات در آموزش پزشکی داشته باشد. این مطالعه با هدف مرور و ترکیب بهترین شواهد موجود در مرور متون و پاسخ دهی به این سوال انجام شده است که: "در آموزش پزشکی موثرترین روشهای آینده پژوهی کدامند؟"

روش: بر اساس راهنمای بهترین شواهد آموزش پزشکی (BEME)، مرور متون با استفاده از پایگاه های PubMed، Scopus، Eric، Web of Science، Google Scholar (1976-2019) و با استراتژی جستجو ("مطالعات آینده پژوهی" یا "مطالعات آینده")، آموزش پزشکی و "رویکرد یا روش" انجام شد. جستجوی دستی و جستجوی مقالات خاکستری نیز انجام شده است. با توجه به معیارهای ورود، تمام خلاصه ها و مقالات به وسیله دو داور مورد بررسی قرار گرفت. با استفاده از مدل فرآیند پیش بینی (3P)، تجزیه و تحلیل و سنتز مطالعات گوناگون انجام شد.

یافته ها: پس از غربال 1533 خلاصه، هفت مقاله مناسب بر اساس معیارهای ورود وارد مطالعه شدند. طیف گسترده ای از روش های آینده پژوهی برای آموزش پزشکی معرفی شده است، اما از این میان روش های اقتباسی از سناریو، با اقبال بیشتری روبرو بوده اند.

نتیجه گیری: کاربرد روش های اقتباس شده از سناریو، بیشترین روش مورد استفاده در مطالعات آینده پژوهی در آموزش پزشکی بوده است. تنوع و گستردگی مطالعات آینده پژوهی در آموزش پزشکی، لزوم توجه بیشتر به انجام مطالعات اختصاصی تر و متمرکز بر تعداد محدود روش های آینده پژوهی در این زمینه را یادآوری می کند.

واژه های کلیدی: مطالعات آینده پژوهی، رویکرد، آموزش پزشکی، BEME

میڈیکل فیئلڈ میں مستقبل کی تحقیقات کے بارے میں بی ای ای ایم کے سسٹماتیک رہنمائی کے مطابق تحقیق

بیگ گراؤنڈ: پچاس سال قبل میڈیکل فیئلڈ میں مستقبل کے لئے تحقیقات کا پروٹوکول بنایا گیا تھا لیکن اس پر محدود پیمانے پر عمل کیا جا رہا ہے۔ مستقبل کی تحقیقات کے اصولوں سے میڈیکل سائنس پڑھانے میں آسانی ہوگی۔ اس تحقیق میں اس سوال کا جواب دینے کی کوشش کی گئی ہے کہ 'میڈیکل فیئلڈ میں مستقبل کے لئے تحقیقات کرنے کا موثر ترین طریقہ کیا ہے؟'

روش: بی ای ای ایم کے مطابق متعدد ویب سائٹوں سے مقالات حاصل کئے گئے۔ ان مقالوں کو دو ماہرین نے جانچا، یہی تھری ماڈل سے ان کا تجزیہ کیا گیا۔

نتیجہ: ایک ہزار پانچ سو تینتیس مقالوں میں سے سات مقالے ایسے تھے جو تحقیق کے لئے مفید تھے۔ ان میں میڈیکل فیئلڈ میں مستقبل کی تحقیقات کے لئے متعدد راستے بتائے گئے ہیں۔

سفرارش: سناریو سے اقتباس لینے کی روش مستقبل میں تحقیقات کے لئے سب سے زیادہ استفادہ کی جانے والی روش ہے اور اس سے میڈیکل فیئلڈ کو سہارا ملا ہے لہذا اس روش کی اہمیت پر تاکید کی جاتی ہے اور اسے اپنانے کی ضرورت ہے۔

کلیدی الفاظ: میڈیکل، مستقبل، تعلیم

INTRODUCTION

Futures studies have found an increasing prominence in the scientific community. The goal of futures studies is unique: clarifying the range of possible futures and creating images of attainable and desirable futures. "Futures Studies" is preferred to "future Studies" because it considers possibilities and preferences not just estimating the probable future (1). Futures studies is the formal name of the systematic discipline which is a social, interdisciplinary and multidisciplinary science dealing with conditions, events, trends, and turning points in future; it is the study of alternative futures (1-4). Probable, possible, preferable futures, present trends, and panoramas are five types of alternative futures (5). The term "Futures" highlights that the future may have different forms and a wide range of futures may occur, therefore, we will face uncertainty. The use of future studies in terms of applied approaches and methodology reaches over 50 years so it is rather a young science especially in the areas of education. There are increasingly various future studies depending on the given situation. These methods and approaches will help us to determine the probable future, to develop a vision, to look at its alternatives, and to develop interactive decision-making programs (6). These studies are well advanced fields established mostly by Europe and the US, as they might be a key factor contributing to social development (7). There is a basic shift from what may be possible under given restraints to what could or should be possible (4).

There are five supplementary, distinct stages for continued improvement in existing knowledge: technological forecasting, search for unexpected changes, the involvement of the relevant social groups, political foresight, and bottom-up initiatives and rapid changes (6). For effective change management, two important factors should be considered: the speed of change (fast, medium, or slow) and time for the reaction to change. From the 1960s, several countries established academic organizations and institutions to direct futures studies (6, 7). Observations on future curriculum would consist of in-depth research on future possibilities, risks, and their impact. Two main features of the future curriculum are: 1) recognizing the main procedures with high probabilities to happen in future related to education and 2) estimating on national and global trends of the future that are linked to education (7). Educational Futures provide: (1) a summary and analysis of opinions about where education should be going, (2) a relocation of the future as challenged space, a narrative that can be deconstructed and problematized, and (3) an exploration into the true claims about the future (8). The traditional academic view of medical education as a translation of learning theory into clinical practice is no longer enough to help us face the culture of change and uncertainty in medical practice. The triad of identity, power, and location is the major framework for the reconceptualization of medical education for the future(9). We should look to the future and develop a new curriculum and advanced methods to teaching and learning that will empower students to develop their skills, knowledge, and understanding to prepare them for the

challenges of the 21st century(10). If Universities recognize their abilities to intentionally and consciously change their attitude toward the future and shape the future, they will have a chance to build a beneficial future (6).

Despite the great importance of futures studies, few research are done in Medical Education on this type of studies and its approaches (11). Most futures studies related to medical sciences have discussed the treatment and investigation of various clinical practices (12, 13). Therefore, the aim of the present systematic review was to assess futures studies approaches in Medical education.

METHODS

Using well-known, worldwide recognized BEME Collaboration guidelines as a systematic review framework (<http://www.bemecollaboration.org/Publications+Research+Methodology/>), we conducted a systematic review to address the following research question: What are the most effective futures studies approaches in medical education?

Inclusion criteria

Only studies that used the words Futures studies in education or medical sciences were included in the study. Also, just English language reports were chosen and included.

Types of outcomes

The primary outcomes of this systematic review were those effective methods and approaches used in Medical education.

Search strategy and sources

To ensure the depth and breadth of coverage, a dynamic combination of Medical Subject Headings (MESH) and free text terms were used. The electronic databases of PubMed, Scopus, ERIC, Web of Science, and Google Scholar (1976–2019) were searched. The search strategy was ("futures studies" OR "future studies" AND "medical" AND "education" AND "approach" OR "method"). To confirm inclusiveness as well as to reduce the chance of missing relevant study we performed supplement searches by reviewing the reference lists of review articles and included studies.

Data collection and analysis:

Study selection

Two independent assessment of titles and abstracts of studies were performed by two reviewers. For potentially relevant studies, the full text of articles was reviewed in duplicate and conflicts were resolved as needed.

Data extraction and management

By means of a BEME coding sheet adapted to suit specific review needs, two study authors (TE and JR) were independently extracted data from all relevant studies and then the full extraction was performed. The two authors were involved in a process of orientation to the tool to ensure inter-rater agreement (Kappa of 0.8). Conflicts were resolved by the third evaluator (TE, JR, and KN).

Methodological quality

Using BEME criteria, the internal validity of each study was separately evaluated to ensure meaningful comparison with other published studies; this model was introduced by BEME for educational contexts. The Kirkpatrick Model was engaged

to examine and synthesize the included studies. This model was introduced by BEME for educational contexts (14). To evaluate the quality of reporting and risk of bias assessment, the present researchers used the strobe checklist (15). The minimum accepted score was 10.

RESULTS

The results of this systematic review were derived from 7 eligible studies with the subject of futures studies approaches in Medical Sciences. These studies were selected from a total of 1533 studies that were examined in depth; after the deletion of the duplicates, 428 articles remained. Considering inclusion criteria and screening the titles, abstracts and finally full texts of remained articles through critically appraisal process, using STROBE checklist by two reviewers, finally seven articles were selected for analysis. As shown in Table 1, a range of approaches and methods were presented in selected articles for the futures studies. As shown in Table 1, collaborative, interdisciplinary, and bottom-up approaches, especially in the last 10 years, have been more and more sought by futurists. Based on the results of this study, a wide range of methods is used for future studies, but we can see one prominent method in these studies, scenarios. The exploratory scenarios, scenario writing, Scenario planning, and trend-based scenarios are the common most used methods in selected studies. Moreover, it can be seen, all studies pointed out both quantitative and qualitative techniques as tools for supporting the aim of studies.

DISCUSSION

In the present study, the approaches and methods used or proposed by selected studies for futures studies have mainly referred to both quantitative and qualitative techniques, and in the meantime, the use of scenario-specific methods has been more prominent. It is believed that two fundamental paradigms have influenced the growth and development of futures studies. The first paradigm bases its argument on the deterministic future and the second paradigm bases on indeterministic futures, probabilities, modeling, and the effects of external trends (technical and system thinking). In emerging paradigms, internal dynamic instabilities, inconsistencies, and dialectic thinking are accepted (16). Different types of scenarios can be used to obtain a number of different ends; they are internally coherent portraits of possible futures and as a prime technique for future studies (inconsistent with our results), they have long been used by educational planners and analysts as powerful tools to support in decision making in the face of uncertainty(17, 18). The scenarios have recognized to be particularly appropriate to discover environmental issues that are distinct by processes of complex and long term changes (19). Rahmanian et al. (2019) pointed out that in order to support futures studies in the health field we should consider both the intellectual and cultural contexts in the form of designing appropriate training programs (20). Deklotz (2013), examined the use of scenario planning in a specific K-12 public education system. The results revealed the important

Table 1. List of articles that made up the systematic review of futures studies approaches

Author	Year	Aim of the study	Approaches/ methods
Monda	2018	How the methodology and approach of futures studies could be useful in the research of social future?	quantitative and qualitative data, exploratory scenarios
Marton	2018	to analyze the historical and current state of the education and practice of futures studies (FS)	quantitative and qualitative data, linear modeling, trend extrapolation, scenario writing, evolutionary modeling, participatory methods, and chaos calculations
Goode et al.	2017	Why We Need Critical Future Studies?	interpretive or empirical, cultural analysis, pluralism and multidisciplinary contributions
Hosseini Golkar et al.	2017	Appropriate types of futures studies scenarios in health	Scenario planning, Trend-based scenarios, intuitive logic, and structural analysis approaches
Siraj et al.	2011	Development of Future Curriculum via Futures Studies	Delphi technique, future scanning and analysis method, historical analogy, cross impact analysis, technological forecasting, alternative futures projection, relevance trees, visioning approach, Scenario planning, Word mapping, Linear or classic projection, bibliographic analysis, environmental scanning, trend extrapolations, technological impact assessment, future wheels, science fiction, intuition and intuitive forecasting, CERT ¹ /CPM ² analysis, and Short, medium and long-range planning
Bell	1996	to describe some fundamental features of futures studies	simulation and modeling, developmental analysis, sampling techniques, statistical analysis, data-gathering, surveys, participant observation
McHale and McHale	1976	An assessment of futures studies worldwide	Descriptive, exploratory, prescriptive

¹ Computer expression recognition toolbox
² Critical path method

impact that the scenario planning had on the educational system's decisions and directions (21).

Morison et al. (1984), studied the effects of future studies and the strategic planning process on higher education. According to their opinions, while traditional long-range planning seeks and estimates the institution's internal development, the main concern for strategic planning is a range of possible social conditions that may affect education. The environmental scanning technique is derived from futures studies and is an essential part of strategic planning (22).

The methodological instruments of futures studies are many and varied. This diversity of approaches and methods can be confusing for the researchers or those who wish to use the study's findings. However, one cannot expect to get the best and ideal method to predict and forecast the future complex conditions and its uncertainties. Two types of methodology for these studies are data-based approaches of prediction and approaches of foresight (2, 6). One of the factors influencing and explaining the differences between the methods used in futures studies is the difference in the stability of the situation or the existence of uncertainty(2). Novakey and Gubik (2018), conducted a study on managing uncertainty in futures studies. According to their findings, the uncertainty can be reduced by reasonably applying and combining methodological principles of futures studies by recognizing and handling unstable conditions (23).

One of the limitations of the present study is the lack of

suggesting the best use of scenarios in medical education. Considering the educational system situations and by the combination of powerful and suitable methods, the prediction of future events will facilitate. It seems that achieving a golden guideline for future studies in medical education is still a dream. Therefore, it is suggested that in future studies, a more specific and more detailed method of futures studies should be considered in Medical education. Methods and approaches of futures studies in medical education are very diverse and the use of different types of scenarios is the most common method. A closer look at the effects of applying a limited number of these methods on various aspects of medical education is advisable.

Ethical considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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