



POLICY BRIEF

Admission of Medical Students through Graduate Entry as an Alternative for Traditional National University Exam in Iran: A Policy Brief

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ABSTRACT

Admission of medical students holding previously obtained academic degrees through graduate entry (GE) is well underway at many credible universities worldwide. In Iran, the GE system can lower the pressure on centralized medical student admission and reduce the problems stemming from that. The difference between GE and the traditional one is not limited to student admission and it generally involves accelerated courses in terms of duration. Moreover, the educational process is also different from that of the regular traditional system. Presently, only a small number of medical students are admitted through GE in Iran. This policy brief includes a study of student admission based on the GE method, a comparison and contrast to the traditional approach, a statement of probable problems, and a final presentation of suggestions for the improvement of this procedure. Although a scrutiny of novel educational procedures and an exact prediction of curriculums entail specialized working groups, two preliminary stages for implementation of GE have been recommended in the current policy brief. It is recommended to carefully predict and monitor GE procedures. Given the necessary superstructure and facilities, the resultant procedure should be initially employed in larger universities with students who have prior education related to health sciences, and subsequently be transferred to other universities and bachelor degrees. It is also recommended that a special working group be convened to examine the new curriculum at ministry level and be tentatively convened in one or more universities. Also, economic studies from an educational perspective are recommended to weigh the cost-effectiveness of the new method.

Key words: Medical Education, Graduate Entry, Policy Brief, Iran

Introduction

Iranian National University Exam, also known as Konkour is the most comprehensive national process for evaluation and selection of

candidates for university entrance. It is managed by National Organization of Educational Testing of Iran (NOET) and major universities of each

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city throughout the county(1). The history of Konkour goes back to 1962, and since then it has been the main way for entering the state universities of Iran (2). Although, implementation of Konkour could unify and centralize the admission process, it has been associated with challenges and controversies. For example, evidence shows that it is a poor predictor for the performance of medical students in future and is not comprehensive enough to cover both cognitive and non-cognitive criteria (3). As participation and success in Konkour play a crucial role in the career of students, the candidates experience tremendous psychological distress(3). The quantitative and qualitative surveys reveal that Konkour imposes a great deal of negative psychological wellbeing and even economic impact on students and their family (4). Moreover, those who fail significantly show lower self-esteem (5). This event is more stressful and competitive for candidates who want to enter medical schools (6). These challenges, motivate authorities to find alternative methods to select students particularly for medical schools of Iran (7).

To solve this problem, several solutions have been proposed, including the gradual elimination of entrance exams. Regarding the field of medicine, one of the proposed solutions is to admit students from the graduate level. In Iran, it has been proposed many times to admit medical students from graduate level. In this context, a study was conducted in 2016 with the aim of examining the opinions of students, professors and members of the Supreme Council of planning. The medical students participating in this study believed that choosing the field of medicine is not conscious and with real interest, and almost everyone agreed that by changing the method, people with more maturity can be chosen. The students generally agreed with the implementation of the GE plan. In general, all the participating professors also agreed with this plan in the group discussion and considered it an effective step to consciously choose the field of medicine and improve the status

of basic sciences in the country. None of these professors considered the result of the national entrance exam as a criterion for the correct selection of a student. Most of the people who were interviewed (all except one person) pointed out the positive effect of this plan on strengthening basic sciences during the medical period. All the interviewees considered the basic change in the educational content necessary along with the change in the student admission method and wanted this program to be predetermined. Most of the interviewees mentioned the increase in the age of students at the time of graduation as the main problem of the plan (8).

Currently, Tehran University of Medical Sciences organizes this course. The aim of this course is to attract capable graduate students from other fields in medicine in order to improve the level of graduates and increase the motivation of medical students. Tehran University of Medical Sciences uses a special medical entrance exam for this purpose every year. This test is somewhat similar to Medical College Admission Test (MCAT) in America (9), International Medical Admissions Test (IMAT) (10) in Italy and University Clinical Aptitude Test (UCAT) in the United Kingdom (11). Bachelor's graduates of experimental and mathematical fields who were 25 years old and had an overall high school diploma score of above 18 and an overall graduate average above 16 could participate in it (12).

The purpose of this study is to examine the student admission process using the GE method, comparing it with the traditional method, showing the differences, possible problems and the necessary suggestions in the form of a policy brief for the development of this process in Iran.

Comparison of two systems of graduate admission and traditional admission in students' performance

Evidence suggests that GE is a valuable experience from the perspective of students, patients, and teaching physicians. Some universities are determined to continue and expand it. Although

more evidence is needed to improve the admission conditions of students in GE, in general, it can be said that these students are more involved in their work environment after graduation (13). Also, compared to traditional candidates, they were significantly more conscientiousness, and had more accuracy, self-confidence, self-control, social relations and less anxiety. However, the empathy of these graduates is less than others (14).

Adult learning theories suggest that GE students often exhibit higher levels of motivation, enhanced learning abilities, self-directed skills, and valuable life experiences. Consequently, clinical professors typically have a better understanding of these learners. Therefore, they are more driven towards learning, which subsequently boosts their motivation to pursue knowledge (13).

According to the studies, the students of traditional system are on average 8 years younger than the entrants of the GE course. Students in traditional systems were motivated to meet parental expectations, but most GE course entrants enter the medical field with the need for professional independence and a desire to prevent diseases. Students in traditional systems are usually stressed due to doubts about being a doctor, While GE course entrants experience stress due to lack of free time, finances and balancing commitments. Results of one of the studies, did not show a significant difference between the groups in terms of academic performance (as measured by the award of medical school honors) or research outcomes (as measured by earning a research degree during or after medical school training, publication of scientific papers or holding career positions in the research sciences). In addition, there were no differences in job positions held by doctors, general practitioners or other specialties as to occupation, practice location (rural or urban) or employment sector (public or private). There is no clear advantage, at least on the outcomes measured in this study, to restricting medical school entry to either those candidates from secondary school or those with academic backgrounds. Medical schools could reasonably broaden their selection criteria to

accept more candidates from both graduate and secondary schools without compromise medical school and practice outcomes (15).

A study was conducted by Dean et al. to compare the preparation for hospital internship between GE and traditional method students. According to the results, GE students are equally well-prepared as traditional students for internships and clinical work with a problem-oriented approach (16). GE students performed as well as traditional students prior to entering the full-time clinical part of the course, despite having lower A-level grades. Traditional candidates performed better on midterm exams, but lost this advantage in final professional exams. GE students performed as well as traditional students on final exams despite a shorter 4-year accelerated course (17).

In summary, the benefits of admitting a medical student from GE based on the available evidence are:

- Improving educational outcomes (such as clinical reasoning skills) (18)
- High motivation of students (GE students are less influenced by external factors and pressures of family and society and choose to study medicine more with the aim of care or prevention of diseases as well as professional independence) (19) (18).
- Increasing students' well-being (increasing flexibility and having the opportunity to make important career decisions in more time) (18).
- High diversity of students: selection of students from diverse backgrounds (18) (21)
- Improving learning strategies (Bachelor degree students have learning skills and have different approaches for studying and collaborative learning) (18, 19).
- Improving professional outcomes (18)
- The possibility of more self-learning: BA graduates are highly prepared in terms of interpersonal skills, trust, partnership, comprehensive care and self-learning (19).
- Increasing access to the medical school: people

who did not succeed in entering the medical school due to poor socioeconomic conditions and unfavorable high school conditions can enter the medical field and work in this profession (19, 20).

- Informed choice: students are given the opportunity to understand medical profession, and the choice of a medical career will be informed. This increases student motivation and reduces burnout (21).
- Problem-based Curriculum: GE students would be better suited to the problem-based curriculum (21).
- Fair selection: students from different academic and personal backgrounds are selected (21).
- Broader experiences of doctors: this plan trains different doctors with a variety of skills and opinions due to the acceptance of graduates with diverse experiences (21).

Characteristics of the educational process after entering medical school through graduate entry

A: Deep learning

Evidence shows that students who enter medical courses through GE are more inclined to use a deep learning approach. At the same time, being older and having a previous university degree are mentioned as reasons for this difference (22).

Studies have shown that students who have a deep approach to learning, connect different materials and principles and try to make sense of what they learn. This feature is also known as holistic approach. The principles that develop this type of learning can include the use of evidence, reasoning and discussion, as well as chain processes. In a deep learning approach, students' understanding of subjects is monitored more thoroughly. Conversely, the traditional method tends to foster surface learning, where the emphasis is on rote memorization.

B: Spiral curriculum

The type of educational program in GE system can also be different from the traditional system. So that in GE system, some special education centers

use integrated and spiral curriculums (23-25). In spiral curricula, various subjects and themes are reviewed repeatedly. Certainly, a spiral curriculum not only revisits topics but also enriches the complexity of the material with each review, incorporating new concepts based on earlier content (26). Some other main characteristics of spiral curriculum are as follows:

- Every time the subjects are revisited, the complexity of the topics increases, and new educational objectives are introduced while also reinforcing the previous ones (26).
- Each lesson builds upon the previous ones. The new knowledge and skills are directly connected to what was learned in earlier phases of this spiral process (26).
- Throughout this process, students' competencies and abilities grow each time they revisit the subjects, continuing in a cycle until the educational goals are met. It's important to regularly assess this enhancement of abilities during educational processes (26).

C: Accelerated education process

Universities that accept medical students through GE use accelerated learning methods in addition to integrated spiral curriculum to achieve their educational goals (23). For example, at Oxford University, the accelerated medicine course covers the initial two years, focusing on basic science and clinical skills to prepare students for the following two years of standard course. This educational strategy is specially designed for GE students, with a strong focus on the practical elements of clinical practice (27).

D: Integration in curricula

Integration of medical courses is an effective strategy to achieve the educational objectives of GE students and to align with international standards. This approach often considers that giving information separately reduces their effectiveness and limits their influence. This is while the integration of courses can improve the motivation of students, increase the quality of

education and reduce the study time. This integration is typically categorized into two types: horizontal and vertical. Horizontal integration involves merging subjects with a common theme within the same academic year or course. Conversely, vertical integration refers to linking subjects across different academic years within a

curriculum. The research results indicate that even the integration of basic and clinical courses in Iran has had a significant effect (28).

Policy options

A summary of the comparison between traditional and GE systems is shown in Table 1.

Table 1. Comparison of advantages and disadvantages of traditional and GE system

Method	Characteristics
Traditional System (Konkour)	<ul style="list-style-type: none"> The lack of correlation between grades and future academic and career success Insufficient knowledge about the chosen field Psychological pressure on the individual and family Imposing false financial costs on families Promotion of educational institutions Lack of sufficient attention to educational background and non-cognitive talents The non-specialization of the test and the lack of attention to the special prerequisites of the medical profession Centralized evaluation, computerized and easier monitoring Low cost, one-stage event, high speed of implementation
Policy suggestion: GE System	<ul style="list-style-type: none"> Challenges of implementing it in small universities with limited resources The need to form specialized teams for designing and planning Reduction of entirely theoretical and impractical course content Focus on aligning educational material with the needs of the job market Greater focus on empowerment, autonomy and learning in the clinical setting Designing educational material according to the specific needs of GE students Using spiral curricula and deep learning approaches Shortening the journey from starting a bachelor's degree to earning a professional doctorate The possibility of using the accelerated training method

The experience of entering the field of medicine from a bachelor's degree has a long history as an accepted and popular option globally. As mentioned, many world-class universities use this educational system. Transitioning from a bachelor's degree to a medical program enhances the diversity of student demographics and academic backgrounds. Some universities, based on the experience of other universities and modeling, are looking to create a mechanism to enter medicine from bachelor's degree. Global evidence indicates that graduates who enter the field of medicine from the bachelor's degree are

effectively successful in the medical profession.

In Iran, this program is exclusively organized by one institution, —the leading university of the country, Tehran University of Medical Sciences. However, enhancing this approach to medical education requires a thorough assessment of the entire higher education framework and the distinct characteristics of the nation's medical science education system. Generally, the following points can be highlighted in this context:

1. One advantage of this approach is that it allows individuals to enter the medical field after

completing their bachelors' studies. Over the past decade, the student admission process relying on the national entrance exam has faced significant criticism. This exam is a single-step test centered on basic knowledge rather than skills and competencies, utilizing multiple-choice questions (MCQs). Evidence suggests that it is not an effective predictor of a medical student's future academic and professional success. For traditional entry with a high school diploma, failing to perform well in the entrance exam can prevent someone from pursuing a medical career, exerting substantial psychological pressure on candidates and challenging the principles of educational equity. By allowing entry into medicine from a bachelor's degree, individuals have the opportunity to pursue medical education at higher levels.

2. In the last decade, the interest in experimental fields has increased, and in the same proportion, the interest in mathematics and humanities has decreased.

Interest in pursuing medical studies in Iran is on the rise, with countless students and families eager to follow this academic route. However, many of these individuals, due to their inexperience and age, remain unaware of the difficulties and hardships associated with the medical profession. Many volunteers have traits that are not compatible with the medical profession, and they do not even have the talent and interest in medicine, but the external pressures and enthusiasm in the society cause them to choose unknowingly. On the other hand, people who decide to enter medicine after graduation make a choice by knowing more about the education system, service delivery system, medical profession and based on experience and interest. This conscious and realistic choice helps to increase the quality of education and professional commitment during the medical career.

3. Entering the field of medicine through a high school diploma allows candidates to establish their career path early on. Given the youthful nature of the candidates, there is an opportunity to develop and refine a skilled, elite, and efficient workforce

for the healthcare system. But this opportunity itself can become a threat to the health system. Pursuing a medical career without adequate preparation and often amidst intense competition can result in lack of motivation, frustration, academic dropout, career burnout, and premature departure from the profession. In the GE admission model, individuals are anticipated to excel and achieve greater success due to their increased maturity and enhanced knowledge.

4. Although it is undeniable that choosing medical students from those with a bachelor's degree is essential, it is crucial to consider that the educational process and schedule for graduate entry into medicine differ from the traditional method. The course duration for GE students is typically accelerated to 4 years. However, in Iran's current GE system, only compliance with the unit is sufficient, and there is limited international documentation available on this approach. The variation in both content and quantity of course units, coupled with challenges in alignment, could extend the medical program's timeline from entering the bachelor's degree to over 10 years, delaying graduates' entry into the workforce. It is recommended that, prior to implementing this regulation, the educational process under the GE framework be thoroughly reviewed and assessed.

5. Applying reforms in the curriculum, post-admission processes and educational approaches is a complex issue and should be carefully examined with the participation of all stakeholders and experts in this field. It is suggested that through specialized working groups, the possibility and method of implementing accelerated and integrated education with deep learning approach through spiral curriculum and integration of topics should be carefully investigated.

6. If the quota allocated to GE is restricted and the number of applicants is high, the probability of passing the medical entrance exam may be higher than passing the GE exam. It is suggested that according to the existing experiences, this issue should be investigated more comprehensively so that the candidates can take the exam with more

knowledge.

Policy recommendations

Considering the above remarks, it can be concluded that the educational approach for medical students admitted through the GE requires assessment and accurate prediction. Although the use of new educational methods and the accurate prediction of educational processes and curriculum require the study of specialized work groups, two preliminary phases are suggested for the implementation of these processes using new educational methods.

In the first phase, basic science courses are removed and replaced by a one-year compensatory course using methods based on accelerated learning, spiral curriculum, deep learning, and curriculum integration. At the same time, this teaching method is also suggested for clinical theoretical courses, and this is while physiopathology courses, practical training courses and internships will continue to be conducted in the usual way. In this phase, the total medical course for GE students will be reduced to five years (Figure 1).

- Courses based on accelerated learning approach, deep learning, spiral curriculum and integration of curricular topics exclusively for GE students
- Courses based on traditional educational approaches shared with students of the traditional educational system
- Specific evaluation processes and exams for candidates and students of GE education system
- Joint exams

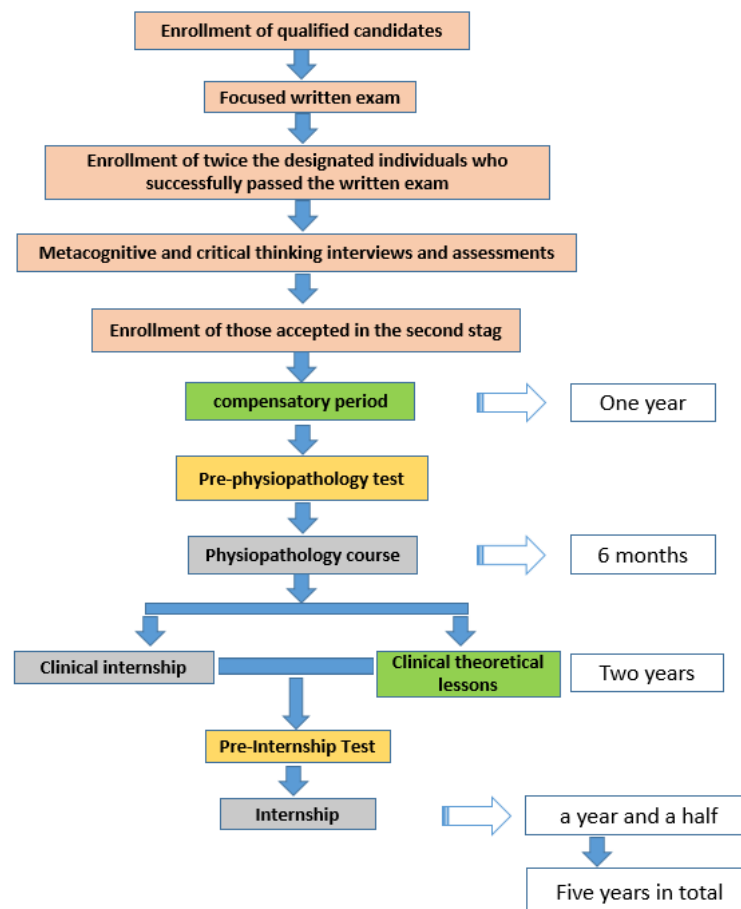


Figure 1. The process of admission and education of medical students through GE (phase 1)

In the second phase, after evaluating the feedback and results of phase 1, the compensatory course of basic sciences and physiopathology will be removed. In line with standard international GE programs, students initially undergo a 6-month pre-internship period focused on integrated

subjects and spiral curriculum, during which essential courses for clinical practice are covered. Following this, they progress to the internship and research stage as outlined in Phase 1. This phase condenses the study period to 4 years, consistent with most international GE programs (Figure 2).

- Courses based on accelerated learning approach, deep learning, spiral curriculum and integration of curricular topics exclusively for GE students
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- Specific evaluation processes and exams for candidates and students of GE education system
- Joint exams

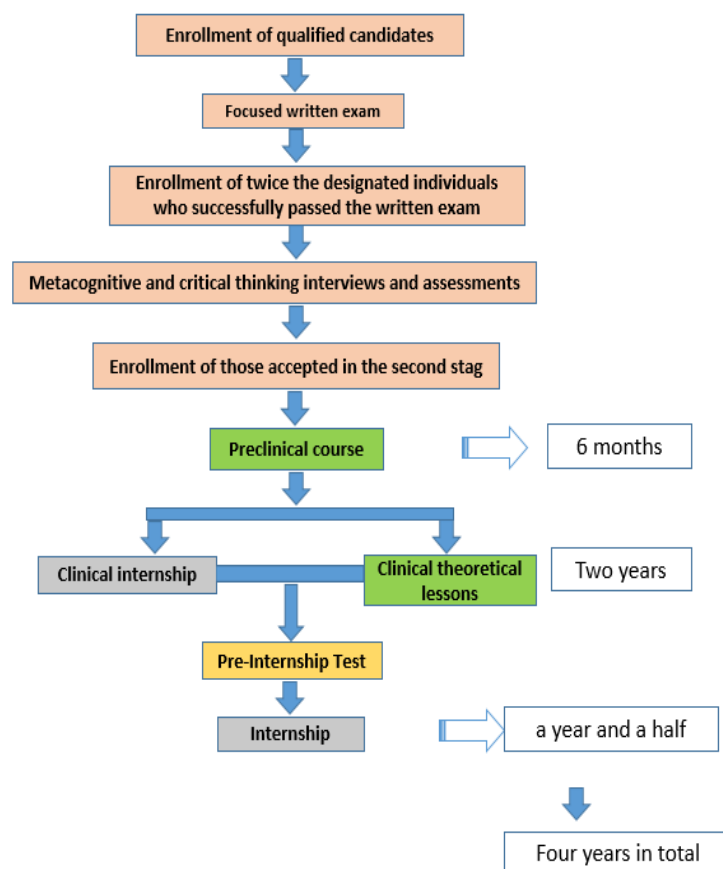


Figure 2. The process of admission and education of medical students through GE (phase 2)

Conclusion

GE approach for selecting medical students has been successfully adopted by many top universities and continues to grow. Enhancing this method, which is currently used in Iran, could effectively address the existing challenges. However, it should be noted that GE students necessitate tailored educational strategies upon entering the medical

program. It is recommended that educational processes tailored to GE students be thoroughly examined and anticipated. Initially, these processes should be implemented in larger universities, provided the necessary facilities and infrastructure are available by admitting relevant graduate students. Subsequently, these measures can be gradually extended to other universities and

graduate fields of study. It is suggested to establish a special working group within the Ministry of Health to evaluate the new educational program on a trial basis at one or more universities. Additionally, conducting economic evaluations from an educational economics perspective is advised to analyze the cost-effectiveness of the proposed model. Given the approach of combining medical education with service provision in Iran's health system and the significance of enhancing this integration, it is recommended to conduct additional research on its impact on medical education, particularly regarding student admissions through the GE method.

Ethics Considerations

This research was approved by the ethics committee of National Agency for Strategic Research in Medical Education (NASR) based on the approval of IR. NASRME. REC. 1401.024.

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Authors' contributions

Concept and design of the study were done by A.H and M.H, data gathering by S.A, H.D, A.H, H.H, A.A and M.H, manuscript writing by A.H and M.H and revision of the manuscript by H.H. All authors read and approved the final manuscript.

Conflict of Interests

Authors declared no competing interests.

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References

1. Khodi A, Alavi SM, Karami H. Test review of Iranian university entrance exam: English Konkur examination. *Language testing in Asia*. 2021;11(1):14.
2. Moradi N, Mohammadi R, Goldasteh A. A

- comparative study of higher education entrance examinations in Iran with some selected countries. *Iranian Journal of Comparative Education*. 2019;2(4):518-32.
3. Farrokhi-Khajeh-Pasha Y, Nedjat S, Mohammadi A, Rad EM, Majdzadeh R, Monajemi F, et al. The validity of Iran's national university entrance examination (Konkour) for predicting medical students' academic performance. *BMC medical education*. 2012;12:1-8.
4. Ahmadi Safa M, Sheykhholmoluki H. An impact study of the Iranian National University Entrance Exam from students and parents' perspectives. *Language Testing in Asia*. 2023;13(1):40.
5. Moatamedi A. The Effect of University Entrance Examination on General Health, Self-Esteem and Psychic Disorders Symptom of Those Who Were not Admitted to the University. *Research and Planning in Higher Education*. 2006(40):55-72.
6. Ashrafi A, Kadhum M, Molodynski A, Bhugra D. Mental health and wellbeing among Iranian medical students: a descriptive study. *The International journal of social psychiatry*. 2022;68(6):1248-52.
7. Kamyab S. The university entrance exam crisis in Iran. *International Higher Education*. 2008(51).
8. Nedjat; S, Majdzadeh R, Rashidian A, S MortazHejrie Admission of medical students from bachelor's degree: why? *Hakim-Journal*. 2007;10(2):1-7.
9. Steed KS, Kadavakollu S. How to prepare for the Medical College Admissions Test (MCAT): six important tips for pre-medical students from rural areas. *Medical Science Educator*. 2019;29(4):1147-53.
10. Nottola SA, ZHURABEKOVA G. The international medical schools in Italy: facts and perspectives. *IV tom 2018*. 2018:9.
11. Paton LW, McManus IC, Cheung KYF, Smith DT, Tiffin PA. Can achievement at medical admission tests predict future performance in postgraduate clinical assessments? A UK-based national cohort study. *BMJ open*. 2022;12(2):e056129.
12. 16th Graduate Entry Admisson Satatement (In persian) [Internet]. Tehran-University-of-MediACL-Science. 2022 [cited April 2024]. Available from: <https://education.tums.ac.ir>.
13. Carter YH, Peile E. Graduate entry medicine: high aspirations at birth. *Clinical medicine (London, England)*. 2007;7(2):143-7.

14. James D, Ferguson E, Powis D, Bore M, Munro D, Symonds I, et al. Graduate entry to medicine: widening psychological diversity. *BMC Medical Education*. 2009;9(1):1-8.
15. Rolfe I, Ringland C, Pearson SA. Graduate entry to medical school? Testing some assumptions. *Medical education*. 2004;38(7):778-86.
16. Dean SJ, Barratt AL, Hendry GD, Lyon PM. Preparedness for hospital practice among graduates of a problem-based, graduate-entry medical program. *Medical journal of Australia*. 2003; 178(4):163-6.
17. Shehmar M, Haldane T, Price-Forbes A, Macdougall C, Fraser I, Peterson S, et al. Comparing the performance of graduate-entry and school-leaver medical students. *Medical education*. 2010;44(7): 699-705.
18. Cullen W, Power D, Bury G. The introduction of graduate entry medical programmes: potential benefits and likely challenges. *Irish Medical Journal*. 2007;100(6):500-4.
19. Carter YH, Peile E. Graduate entry medicine: high aspirations at birth. *Clinical Medicine*. 2007;7(2):143.
20. Sefton A. Graduate entry to medical school. *MEDICAL EDUCATION*. 2004;38:1130–40.
21. Elliott S, Epstein J. Selecting the future doctors: the role of graduate medical programmes. *Internal medicine journal*. 2005;35(3):174-7.
22. Taylor K. Learning approaches of graduate entry and undergraduate medical students, their experiences of learning, and motivations to learn: A mixed methods study. *MedEdPublish*. 2016;5(104): 104.
23. Medicine (Graduate Entry), MBBCH [Internet]. [cited July 2022]. Available from: <https://www.swansea.ac.uk/undergraduate/courses/medicine/medicine-graduate-entry-mbbch/>.
24. Medicine and Surgery (Graduate Entry) [Internet]. University of Liverpool. 2024 [cited May 2024]. Available from: <https://www.liverpool.ac.uk/courses/2023/medicine-and-surgery-graduate-entry-mbchb>.
25. Programme Specification for Bachelor of Medicine, Bachelor of Surgery [Internet]. University - Of -Worcester. 2023 [cited May 2024]. Available from: <https://www2.worc.ac.uk/aqu/documents/MBChB2023-24.pdf>.
26. Harden RM. What is a spiral curriculum? *Medical teacher*. 1999;21(2):141-3.
27. Medicine (graduate-entry/ accelerated) [Internet]. [cited July 2022]. Available from: <https://www.ox.ac.uk/admissions/undergraduate/courses/course-listing/medicine-accelerated>.
28. Yamani N, Shater Jalali M. Curriculum Integration, with Emphasis on Integration in Medical Education. *Iranian Journal of Medical Education*. 2012;11(9): 1202-13.