

# Dropout risks of medical students

**Gabriella Pusztai**

Debreceni Egyetem

**Szabó Marianna Dinyáné**

Semmelweis Egyetem

**Elek Dr. Dinya** (✉ [dinya.elek@public.semmelweis-univ.hu](mailto:dinya.elek@public.semmelweis-univ.hu))

Egészségügyi Közszolgálati Kar <https://orcid.org/0000-0002-2620-8649>

**Marianna Szemerszki**

Eszterházy Károly University

---

## Research article

**Keywords:** medical students, dropout, exceeding, self-financed course

**Posted Date:** November 7th, 2019

**DOI:** <https://doi.org/10.21203/rs.2.16895/v1>

**License:**   This work is licensed under a Creative Commons Attribution 4.0 International License. [Read Full License](#)

---

## Abstract

**Background** The moderation of student dropout is an important aim in the medical training that requires significant resources from individual and national economy points of view. Hungarian medical training has high quality and strong international attraction, although students are exposed to significant stress in the extremely selective and strict training at the beginning, and their professional identity is being shaped between crises. Learning progress is often hampered by recurring exams and grade retentions.

**Methods** In our Study we are going to examine the dropout behaviour of medical students. During our research, the national higher education statistics are being analysed based on the data base of medical students who started in 2010 (N = 977). The question of research is how the rate of dropout people who has finished or exceeded the 6-year long training is forming and what kind of factors limit the risk of dropout.

**Results** Our results indicate that only half of the applicants get admitted to medical training. Half of the admitted applicants could continue without failing, but 30% of them could not obtain absulotorium after 14 semesters. Dropout students are characterized by the early slow-up of their credit accumulations and by making their status passive, which is the shorter-longer termination of their studies. 83.6% of students started in 2010 has been studying in state financed course, and 8% of them has been studying in a self-financed course. 9.4% of state-financed students were dropped out while this rate was 50% from the self-financed course of students.

**Conclusion** According to our consequences, dropout risk can be increased by low credit numbers, passive semesters and the tuition-based financing forms, although dormitory placement can be an advantage.

## Background

The field socialisation of future doctors, the process of the shaping of their professional identity and identifying the factors supporting this are important research topics. Another important question is whether the success of identification with the future role of medical students is determined by their social and demographical characteristics or by the circumstances of their medical studies [16]. Insufficient field socialisation can result in dropout in medical training, individual quit of profession or lack of doctors in case of massive presence of it. The difference of student dropout rates between course fields raised attention to the fact that those who are choosing different fields are affected by diverse factors when it comes to deciding on terminating or continuing their studies. The early formation of professional identity is strengthened by attachments to disciplinary values and relationship nets, besides the high level of requirements of admission and the favourable positional possibilities. These factors can limit the rate of dropout students [18, 19].

At the turn of the Millenium to the effect of the appearance of doctor shortage, the government of UK increased the number of students admitted and initiated special development and examinations in favour of their retention [5]. In other countries the incline of the dropout of medical students was examined to the effect of the change in the structure of higher education and it was stated that the temporal distortion of studies increases the risk of dropout [6]. High school results, admission scores and admission year were proved to be a good predictor regarding the success of students getting their degree, and the admission score indicated in advance the finish of studies in a curriculum period [7]. However, longitudinal analyses came to the conclusion, that the increase of dropout rate can be explained by admission politics, the structure of higher education curriculum, the rate of theoretical and practical courses and the increasing tuition fees [5, 8, 9]. Dropout is further influenced by the hardships of educational costs, the negative effects of taking jobs besides studying, and the fear of being in debt due to the school fees financed by

loans [10, 11, 12, 13]. The effective ways of limiting dropout were learning organisation support provided for students (often formative rating, learning methodology courses, group studying), the increase of the rate of practice, problem-based studying and counsel of time-management and stress-handling [14].

Although in Hungary higher education was financed by the state and it was free of tuition, still 40% of the BA students leave higher education without degree. A qualitative research of 2018 examined those students who started a course more than 10 years ago but did not get any degree. Three significant groups of reason caused their dropout: most of them were dropped out due to material reasons, because the student and his family could not handle the travel and living costs of higher education. Others stated that learning hardships, the negative attitude of teachers and administrators, the lack of their helping hand and lack of information caused dropout. According to the third group, the reason of dropout was the disillusionment from their major or institution, and the disappointment in experiences in practice as compared to expectations [16].

In the medical training in Hungary no multi-cycle courses were introduced as compared to other areas at the joining of Bologna procedures at the turn of the Millennium. So, for example while in the course of economist they introduced the BA and MA courses of 3+2 years, then in the medical, legal and theology courses they kept the single-cycled educational structure. Teacher training was changed to be two-cycled in 2006, and in 2013 they re-set the undivided training in this area too. So future doctors are studying for 6 years in order to obtain diploma. They start their internships and resident years after this so that they can take their medical specialist exam at the end of their 3-5 years long medical course. The extremely long studies delay the becoming of self-sufficient of students and the starting of family. Optimistic future expectations are demolished by the high level of requirements, the extremely difficult studies and the high rate of unsuccessful exams. The inadequate tempo of getting diploma causes labour shortage in certain areas, which is swelled by quit, going to abroad and the aging of medical society [1, 15]. In the outstandingly costly medical training 20% of dropout counts as a big waste of resource in an individual and international level too [3]. In the medical training in Hungary until now 3 groups of students were studying according to financing. Hungarian nationality students have been studying financed by the state if they reached the adequate scores at admittance and if they have not exceeded their limit of 7 years. Only some students who started their second degrees or who did not reach admittance scores have started their studies in self-financing courses, but these were only wealthy people. Mostly foreign students coming from European and Asian countries were studying in self-financed courses in English. The third group of students includes those foreign people who are coming from poor countries out of Europe within Stipendium Hungaricum scholarship, whose studies are financed by the Hungarian state with scholarships. The actuality of our research is that the system of financing as a condition of scholastic records was introduced in the systems since 2015 amongst Hungarian medical students who were studying free of charge so far. This new system supervises the scholastic development and grades of students, and those whose scholastic average does not reach 3 out of 5 or who do not get 36 credits yearly, then they lose state finance and have to pay 8000 EUR yearly as a refunding of expenses. Regarding the average income of families, this can mean a significant growth in dropout.

## Methods

The aim of the research is to examine the dropout behaviour of Hungarian medical students in the educational structure before the reform. The majority of researches dealing with medical students are built on examinations with less case numbers and with questionnaires, and many times they are analysing samples relating to one or more institutions. In this study we are analysing data from anonym individual higher education data base [3, 4]. These anonymised data collected with statistic aim are accumulated and stored by a higher education information system.

In this analysis we were focusing on the progress of students of 4 Hungarian universities who started in 2010. The examination of the anonymised individual higher education data base provided us valid information in some samples about the progress of students. During the analysis we were working with the following variants: gender of the student, age of the student, whether the student lived in dormitory, the categorised variant of the number of passive years, finance form and acquired credit numbers.

During our research we used description analysis, where we were examining rate in case of continuous variants, while in case of discrete variants we were examining and comparing frequency. In order to explore the reason of dropout, we have carried out binary logistic regressive analysis, during which we applied the Forward Wald method.

We regarded  $p < 0.05$  as a significant result. Analyses were done with the IBM SPSS Statistics 25.0 program package) SPSS, Chicago, IL).

## Results

In the general medical course in Hungary the number of applicants and participants is quite stable. We can state that the chance of being applied considering the rate of first applicants and participants is quite low comparing to other undivided courses, as it is usually around 50%. The peculiarity of the 6-year undivided course is that it has dedicated applicants. In case of unsuccessful application, 75-76% of the applicants apply for this same course on the first place when it comes to re-application. In the undivided dentist major this rate is 40-45%. 2/3 of the applicant in the first place apply for this course on the second place also. What is more, every second applicants chose this course on the third place too – only in a different institution. Selection can basically be diverse in institution preferences knowing that the major can only be carried out in full-time course and the majority of applicants and applied will start their studies in state-financed courses (Chart 1).

*Chart 1: The formation of the number of applicants and applied in medical major (2010-2017)*

Year	All the applicants	From this: state-financed	From this: applying in the first place	Applied	From this: state-financed
2010	2772	2761	2098	1046	982
2011	2815	2782	2144	1066	989
2012	2958	2929	2208	1155	1113
2013	2476	2454	1859	1148	1127
2014	2839	2818	2159	1068	1064
2015	2950	2929	2249	1073	1058
2016	2927	2910	2189	1022	986
2017	2780	2763	2089	1029	983
2018	2722	2704	2087	1029	1025

Source: date of general application processed

Although, as we mentioned above, more people are studying in medical training as numerous foreign students are participating in medical training in Hungary, but typically they get admitted through a special application process. In the year of 2017/18 for instance 52.8% of 12.4 thousand Hungarian medical students were foreign. The number of medical students coming outside of Europe who reached Hungarian scholarship, the Stipendium Hungaricum scholarship, is dynamically growing. It was 146 people in 2017 while in 2018 it was 297.

Quarter of the applied students in Hungary is dropped out during the course. This is proven by the data which are showing the formation of the number of people who got certificate between 2015-2017. The number of certified doctors is between 1200-1400, and the number of non-foreign people from this is 450-750 (Chart 2). If we compare this to the number of people mentioned above, then we can still see the difference clearly if we know that the rate of people finished out of time in medical training is high.

*Chart 2: The formation of the number of people who finished the major in general medical course (2015-2017)*

Year	Number of students participating in final examination	Number of statistically finished people	Foreign students
2015	1188	1287	450 (35%)
2016	1374	1371	531 (39%)
2017	1406	1406	618 (47%)

Passive semesters have a pre-indicating role of dropout, as during this, students stop their studies. While only 12% of those who finished their studies had 1 or 2 passive semesters, then 60% of dropout students, and 21% of them had more passive semesters.

Medical training is rather expensive – currently it is 8 thousand Euros (it was 5 thousand Euros in 2010). It is not a coincidence that few people can take self-financed courses, and very few people apply to this in the first place. One part of the applied students had such few points as a result of their high school studies, that they could only apply to self-financed courses, so in 2010 8% of students started in self-financed courses. In every second places students remain on self-finances course while those who have good results can apply for state-financed course- at least for a period of their studies. From the applicants in 2010 only 8% who started in state-financed course were transferred into self-financed courses. Those who remained in state-financed course was only 83.6% in 2010.

There is a significant relationship between dropout and finance forms, and their change (Pearson  $\chi^2$   $p < 0,001$ ). The dropout was 63.4% as compared to the average 15.5% amongst those students who remained in self-financed courses, while it was 9.4% amongst those who remained in state-financed course. The dropout is bigger in case of those students who are put from state-financed courses to self-financed courses. Although the coherence between the two variants does not necessarily mean reason-effect relation as there can be financial and educational hardships in the background as well.

The examination of success of students is very interesting based on our data base (Chart 1). We can see that dropout is the lowest (8% and 9%) in state-finances courses while it is the highest (56% and 63%) in self-financed courses.

*Chart 1: Scholastic success of students belonging to certain finance groups*

In order to test our hypothesis, we used such a binary logistic regressive model on our data, in which the dependent variant was if someone is dropped out or not, while the background variants were those which were in significant relationship with dropout. We were considering the following: gender of student, age of student, whether he lived in dormitory, the categorised variants of the number of passive semesters and finance form. Besides, we used credit number as a continuous covariant variant.

By applying the Forward Wald method, we got such a model in which the finance form and its change did not increase the chance of dropout. Scholastic factors (number of credits and passive semesters) proved to be a significant model forming variant: the higher value of the formal decreased, while the latter increased the chance of dropout.

*Chart 3: Model 1. Result of binary logistic regression*

<b>Variants</b>	<b>B</b>	<b>S.E.</b>	<b>Wald</b>	<b>df</b>	<b>Sig.</b>	<b>Exp(B)</b>	<b>Reference class</b>
1-2 passive semesters	2.303	.496	21.536	1	.000	10.008	none
3 or more passive semesters	2.950	.645	20.952	1	.000	19.110	none
credit value	-.031	.003	81.927	1	.000	.969	continuous variant
Constant	2.909	.486	35.885	1	.000	18.342	

Our model was tested in the way too that we did not put credit number in the system. In this case besides the number of passive semesters, the self-financed status and the transferring to it (except for 'self-finance then state-finance status too'  $p=0.197$ ) had a great chance in dropout. In this model dormitory appeared as a preventive factor: those who lived in dormitory during the course had less chance to dropout.

*Chart 4: Model 2. Result of binary logistic regression*

<b>Variants</b>	<b>B</b>	<b>S.E.</b>	<b>Wald</b>	<b>df</b>	<b>Sig.</b>	<b>Exp(B)</b>	<b>Reference class</b>
all over self-financed	2.425	.415	34.153	1	.000	11.303	all over state course
state-financed then self-financed too	1.213	.305	15.840	1	.000	3.362	all over state course
self-financed then state-financed too	-.848	.657	1.668	1	.197	.428	all over state course
1-2 passive semesters	2.387	.249	91.853	1	.000	10.883	none
3 or more passive semesters	2.950	.645	20.952	1	.000	19.110	none
lived in dormitory	-.665	.271	6.046	1	.014	.514	none
Constant	-3.161	.212	221.821	1	.000	.042	-

## Discussion

International literature rarely deals with the problem of dropout of medical students, while due to the long course time and high course costs serious human and financial resources are at stake. In our study we highlighted some considerable experiences of longitudinal examination of students entering in medical training in 2010. In the Hungarian medical training those students can get admitted who have outstanding scholastic results and who are dedicated, and there is no other higher education course which have such a various society of students. Statistics analysis shows that only half of the medical students starting in 2010 could obtain diploma that is within the time frame of the curriculum. Only 70% of the students could obtain absolutorium by the time their state-financed semester has ended. More than 4/5 of the people belonging to the examined sample has been studying in state-financed form all over their courses. There were few students who took the possibility of paying 5.000 Euros at the beginning of their studies via the self-finance course, which is truly high as compared to wages in Hungary. It was only 8% of students. Only 8% of people belonging to the examined student year changed to self-financed form during their 14 semesters despite the fact that they started their studies in state-financed form.

Dropout is characterised by the early and fierce slow of credit accumulation and the application of passive semesters. Slow credit accumulation indicates hardships in scholastic performance, since after failed subjects it is not possible in medical training curriculum to take up the next subject that is based on the failed one. Due to scholastic hardships and the slow of credit accumulation, during the first 2 years students are further selected, and 1/3 of dropouts leave the course at this point. In our samples, dropout is really low amongst students with state-financed course in all active semesters, and it was only 9.4% who ceased their studies. In spite of this, 63% of those who had self-financed courses and 56% of those who were transformed into self-financed courses were dropped out.

Based on the student data in the data base we carried out a multi-variant analysis in order to identify the factors that influence the chance of dropout the most. The logistic regressive models confirmed that the dynamically collected credit numbers in the examined sample decreased, while the higher number of passive semesters increased the chance of dropout. These two are not fully independent from each other, since the application of passive semester basically means failed exam, so the system could filter those who have scholastic hardships. Finishing studies in state-financed form was itself a factor that increased the possibility of dropout in the sample of 2010 despite that it affected very few students.

## Conclusions

Hungarian medical students enter the course with high point numbers and dedication, but still every second students get their diploma out of course time, and 1/3 of them is not able to obtain absolutorium by the end of the course. In medical training dropout is increased by low credit numbers and passive semesters and the self-financed form. Although dormitory can be an advantage, as it limits the educational costs and the student can gain social capital that can support him in better scholastic performance.

The obstacle of our examination is that after examining significant data base we only get information relating to pass on of only one sample. One-third of them still continued their studies after the closure of data base, which result is unknown. We could have further important connections by examining scholastic rates but based on the data base we can only conclude on unsuccessful course performance, and we do not have data about the formation of scholastic rate in present higher education. Since the filter with scholastic rates means a new selection and the amount of cost is really high, the restrictions for those who enter after reform can bring radical changes. It is important to examine the effect of change in the future as well.

# Declarations

## Ethics approval and consent to participate

Not applicable.

## Consent to Publish

Not applicable.

## Availability of data and material

- The datasets used and analysed during the current study are available from the corresponding author on reasonable request.
- All data generated and analysed during this study are included in this published article and its supplementary information files.

## Competing interests

The authors declare that they have no competing interests.

## Funding

Project no. 123847 has been implemented with the support provided from the National Research, Development and Innovation Fund of Hungary, financed under the K\_17 funding scheme.

## Authors' contributions

GP was a major contributor in writing the manuscript. SZMD organized and implemented the complexity of student data collection. ED analyzed the study data and interpreted the statistical results. MSZ controlled the manuscript.

All authors read and approved the final manuscript.

## Acknowledgements

Not applicable.

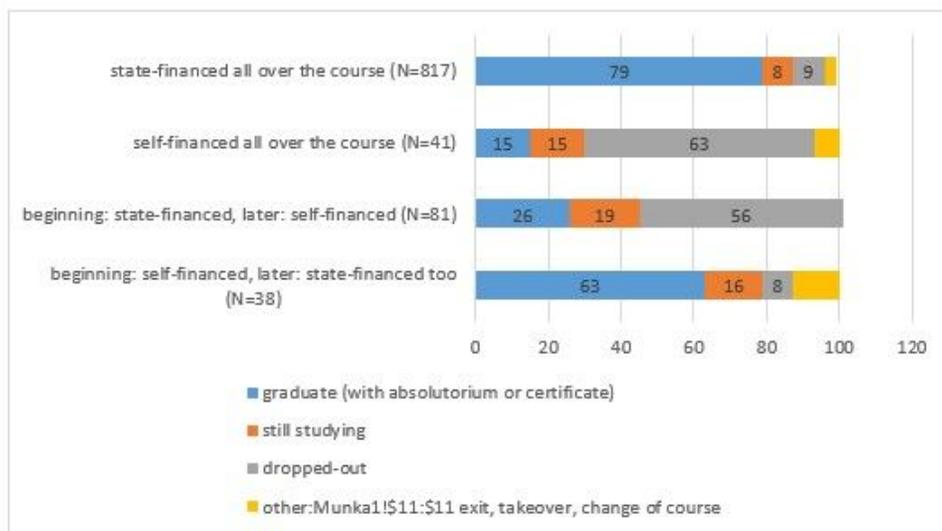
## References

- [1] Gyórfy, Zs. Szél, Zs 2018. Magyarországi orvostanhallgatók külföldi munkavállalási szándékai. *Orvosi Hetilap* 159(1): 31–37. <https://doi.org/10.1556/650.2018.30912>
- [2] Molnár R., Nyári, T., Molnár P. 2006. Remaining in or leaving the profession: the view of medical students *Medical Teacher* 28(5): 475-477 [doi.org/10.1080/01421590600627318](https://doi.org/10.1080/01421590600627318)
- [3] Maher, B.H., Hynes, H., Sweeney, C., Khashan, A., O'Rourke, M., Doran, K., Harris, A. O'Flynn, S. 2013. Medical School Attrition-Beyond the Statistics A Ten Year Retrospective Study. *BMC Med Educ.* 13: 13. doi: 10.1186/1472-6920-13-13
- [4] Arulampalam, W., Naylor R.A., Smith, J.P. 2004. Hazard Model of the Probability of Medical School Drop-out in the UK. *Journal of the Royal Statistical Society. Series A* 167(1): 157-178.
- [5] Arulampalam W<sup>1</sup>, Naylor RA, Smith JP. 2007. Dropping out of medical school in the UK: explaining the changes over ten years. *Med Educ.* 41(4):385-94.
- [6] Wijnen-Meijer M, Van Dijk M. 2014. Effect of the Bologna bachelor degree on considerations of medical students to interrupt or terminate their medical training. *Medical Teacher* 36(2):169-74. doi: 10.3109/0142159X.2013.857012.
- [7] Maslov, Kruzicevic S, Barisic KJ, Banozic A, Esteban CD, Sapunar D, Puljak L (2012) Predictors of Attrition and Academic Success of Medical Students: A 30-Year Retrospective Study. *PLoS ONE* 7(6): e39144. <https://doi.org/10.1371/journal.pone.0039144>
- [8] O'Neill LD, Wallstedt B, Eika B, Hartvigsen J. 2011 Factors associated with dropout in medical education: a literature review. *Med Educ.* 45(5):440-54. doi: 10.1111/j.1365-2923.2010.03898.x.
- [9] Schmidt HG, Cohen-Schotanus J, Arends LR. 2009. Impact of problem-based, active learning on graduation rates for 10 generations of Dutch medical students. *Med Educ.* 43(3):211–218.
- [10] Jolly Paul 2005. Medical School Tuition and Young Physicians' Indebtedness. *HEALTH AFFAIRS* 24(2): 527-535 [doi.org/10.1377/hlthaff.24.2.527](https://doi.org/10.1377/hlthaff.24.2.527)
- [11] Hübner, Malte 2009. Do Tuition Fees Affect Enrollment Behavior? Evidence from a 'Natural Experiment' in Germany. *Economics of Education Review* 31(6) DOI: 10.2139/ssrn.1495119
- [12] Dwenger, N Storck, J Wrohlich, J 2012. Do tuition fees affect the mobility of university applicants? Evidence from a natural experiment *Economics of Education Review.* 31(1): 155-167 DOI: 10.1016/j.econedurev.2011.10.004
- [13] Ross S. Cleland J. Joan Macleod M. 2006. Stress, debt and undergraduate medical student performance. *Medical Education.* 40 (6). 584–589. DOI: 10.1111/j.1365-2929.2006.02448.x
- [14] Abdulghani H.M, Al-Drees A.A, Khalil M.S, Ahmad F., Ponnampereuma G.G, Amin Z. 2014. What factors determine academic achievement in high achieving undergraduate medical students? *Medical Teacher*, 36: (S1), S43-S48, DOI: 10.3109/0142159X.2014.886011

- [15] Kangasniemi M. Winters L.A. Commander S. 2007. "Is the Medical Brain Drain Beneficial? Evidence from Overseas Doctors in the U.K." *Social Science and Medicine* 65(5) 915–23.
- [16] Kovács, K; Pusztai G.; Ceglédi, T ; Csók, C; Demeter-Karászi, Zs; Dusa, ÁR ; Fényes, H; Hrabéczy, A; Kocsis, Zs. Kovács, KE, Markos, V. 2019. *Lemorzsolódott hallgatók 2018*. Debrecen, Magyarország : University of Debrecen, CHERD
- [17] Gude T1, Vaglum P, Tyssen R, Ekeberg O, Hem E, Røvik JO, Finset K, Grønvold NT. 2005. Identification with the role of doctor at the end of medical school: a nationwide longitudinal study. *Med Educ.* 39(1):66-74.
- [18] French, B. F. & Immekus, J. C. & Oakes, W. C. (2005). An Examination of Indicators of Engineering Students' Success and Persistence. *Journal of Engineering Education*, 94(4), 419-425.
- [19] Ulriksen, L. & Madsen, L. M. & Holmegaard, H. T. (2017). The first-year experience of non-traditional students in Danish science and engineering university programmes. *European Educational Research Journal*, 16(1), 45-61.

## Figures

*Chart 1: Scholastic success of students belonging to certain finance groups*



**Figure 1**

Scholastic success of students belonging to certain finance groups