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van Moppes, Nathanja Mariëtte; Willems, Sander; Nasori, Mana; Bont, Jettie; Akkermans, Reinier; van Dijk, Nynke; van den Muijsenbergh, Maria; Visser, Mechteld

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Ethnic minority GP-trainees at risk for underperformance assessments: a quantitative cohort study

Authors

- Drs. Nathanja van Moppes, GP, PhD-candidate and academic teacher, Amsterdam UMC location University of Amsterdam, Department of General Practice and Public Health Research Institute, Meibergdreef 9, Amsterdam, The Netherlands, ORCID: <https://orcid.org/0000-0003-3457-7724>
- Drs. Sander Willems, medical student, Radboud University Medical Center, Nijmegen, The Netherlands
- Mana Nasori, MSc, research assistant, Amsterdam UMC location University of Amsterdam, Department of General Practice and Public Health Research Institute, Meibergdreef 9, Amsterdam, The Netherlands, ORCID: <https://orcid.org/0000-0001-8559-1791>.
- Prof. Dr. Jettie Bont, GP, PhD, head of the department, Amsterdam UMC location University of Amsterdam, Department of General Practice and Public Health Research Institute, Meibergdreef 9 , Amsterdam, The Netherlands, ORCID: <https://orcid.org/0000-0002-5358-0235>
- Reinier Akkermans, MSc, statistician and methodology advisor, Radboud Institute for Health Sciences, Scientific Institute for Quality of Healthcare, and Department of Primary and Community Care, Radboud University Medical Center, Nijmegen, The Netherlands, ORCID: <https://orcid.org/0000-0003-0592-4563>
- Prof. Dr. Nynke van Dijk, MD, professor of education and training and dean, Amsterdam University of Applied Sciences, Faculties of Exercise & Sports, Nutrition,

and Health, Amsterdam, The Netherlands, ORCID: <https://orcid.org/0000-0001-7959-5649>

- Prof. Dr. Maria van den Muijsenbergh, GP, PhD, Professor of health disparities and person-centered integrated primary care, Department of General Practice, Radboud University Medical Center, Nijmegen, The Netherlands, ORCID: <https://orcid.org/0000-0002-4994-4008>
- Dr. Mechteld Visser, PhD, senior investigator, Amsterdam UMC location University of Amsterdam, Department of General Practice and Public Health Research Institute, Meibergdreef 9, Amsterdam, The Netherlands

Contact information

Correspondence should be addressed to N.M. van Moppes, Amsterdam UMC location University of Amsterdam, Department of General Practice, Meibergdreef 9, 1105 AZ Amsterdam, The Netherlands; e-mail: n.m.vanmoppes@amsterdamumc.nl; phone: 0031642309936

Abstract

Background: Recent studies suggest that ethnic minority students underperform in standardized assessments commonly used to evaluate their progress. This disparity seems to also hold for postgraduate medical students and GP-trainees and may affect primary healthcare quality, which requires an optimally diverse workforce.

Aims: (1) determine to what extent ethnic minority GP-trainees are more at risk of being assessed as underperforming than their majority peers; (2) investigate whether established underperformance appears in specific competence areas; and (3) explore 1st and 2nd-generation minority trainees deviations.

Design and setting: Quantitative retrospective cohort design in the Dutch GP-specialty training (start years: 2015-2017).

Method: In 2020/21, the authors evaluated files on assessed underperformance of 1700 GP-trainees at seven Dutch GP-specialty training institutes after excluding five opt-outs and 165 incomplete data sets (17% ethnic minority trainees). Underperformance was defined as the occurrence of (1) preliminary dropout, (2) extension of the educational pathway, and/or (3) mandatory coaching pathways, all prompted by the training institute. The Dutch Central Service for Statistics (CBS) anonymized the files and added data about ethnicity. Thereafter, the authors performed logistic regression for potential underperformance analysis and Chi-square tests for competence area analysis.

Results: Ethnic minority GP-trainees were more likely to face underperformance assessments than the majority group (OR 2.41 (95% CI: 1.67 – 3.49)). Underperformance was not significantly nested in particular competence areas. First-generation minority trainees seemed more at risk than their second-generation peers.

Conclusion: Minority GP-trainees seem more at risk of facing educational barriers. Additional qualitative research on underlying factors is essential.

How this fits in

Equitable opportunities for success for ethnic minority GP-trainees are essential from a social justice point of view. In addition, research indicates that an ethnically diverse medical workforce is essential for developing cultural competencies required for qualified and accessible healthcare in an increasingly diverse population. However, recent studies suggest that ethnic minority (postgraduate) students and GP-trainees seem at risk of being assessed as underperforming in standardized tests. Scientifically quantifying these suggested differences in assessments encountered by GP-trainees from minority groups is an essential step to acknowledging potential disparities. It encourages additional research on underlying factors and interventions to address these factors. As such, it may foster a personalized and culturally sensitive learning climate that educates GPs to provide qualified and accessible healthcare to a diverse patient population. Our study on GP-trainees in the Netherlands demonstrated that for them belonging to an ethnic minority group was associated with increased odds for assessed underperformance despite a selective admission procedure ensuring an adequate entrance qualification level for all accepted trainees. Since Dutch GP-specialty training has essential similarities in many aspects with international GP-training programs, our results may apply in a broader worldwide context.

Introduction

The Dutch population is highly diverse. One out of four inhabitants has a migrant background(1), and this proportion will grow to 39 percent in 2060(2). United Nations data(3) show that these figures are not unique to the Netherlands.

General practitioners (GPs) will increasingly see patients from different cultures and backgrounds, and research shows that ethnically diverse student bodies(4) are essential for developing cultural competencies(5, 6) and improving healthcare quality and access for underserved population groups(7, 8).

Recent studies suggest that minority students do not perform well on standardized assessments commonly used to evaluate their academic performance(9). A large UK meta-analysis on medical students (n=23,742) shows that candidates of 'non-white' ethnicity often face underperformance assessments(10). Studies on medical students in Australia(11), the USA(12, 13), and the Netherlands(14) demonstrate that the assessed performance of ethnic minority medical students remains behind their majority peers. A comprehensive US review on inclusive educational opportunities indicates ethnically biased assessments and grading disparities(15).

UK research shows that these findings may also hold for minority GP-trainees failing specific clinical skills assessments more often than their colleagues from the majority group(16). A Dutch interview pilot suggests ethnic minority GP-trainees are likely to fail or encounter mandatory coaching pathways(17). Yet, quantitative data were lacking to substantiate these findings on eventual discrepancies for ethnic minority GP-trainees. We investigated the extent of potential disparities in assessed performance for Dutch minority GP-trainees, and examined specific competence areas where this underperformance may be nested.

Additionally, we explored possible differences between 1st- and 2nd-generation minority GP-trainees. In many aspects, the Dutch GP-specialty training is comparable to European, British, US, and Australian GP-specialty training programs. Therefore, we assume that our results may apply to a broader context.

Methods

Design

We used a quantitative retrospective cohort design, analyzing data from trainee files provided by the GP-specialty training institutes.

Setting

The Dutch GP-specialty training is a three-year dual-track competence-based education aligned with the internationally recognized CanMEDs system (Table 1). GP-specialty Training Netherlands admits 700-800 new trainees annually, allocated to eight training institutes. Approximately 15% of them belong to ethnic minority groups. 2nd-generation minority trainees received their pre-training in the Netherlands; 1st-generation trainees often completed undergraduate degrees abroad. Extensive entry assessments guarantee a high level of knowledge and language. Once admitted, protocolled interventions, such as regular practical observations, systematic test programs, and reviews of the trainee's completed learning objectives, support high-quality education(18, 19). In case of underperformance, the GP-training institutes can prompt (1) removal from the program, (2) extension of the GP-educational pathway, or (3) mandatory coaching pathways.

Participants

We reviewed trainees' files with starting years 2015, 2016, and 2017. Opt-out emails and advertisements on professional platforms enabled eligible participants to disallow using their data.

Outcome measures

The outcome measure for our first study question was the relative risk of assessed underperformance. We operationalized this outcome as the occurrence of at least one of the following events: (1) undesired preliminary dropout, (2) extension of the educational pathway, or (3) mandatory coaching pathways).

The second outcome measure was the proportion of assessed underperformance in specific competence areas (Table 1). Notably, assessors could allocate underperformance events to more than one competence area. Also, trainees could face more events of underperformance during their GP-training educational pathways.

Variables

Minority group: refers to ethnic minorities, following the official definition of Statistics Netherlands (CBS), defined as foreign-born (1st-generation) or born from at least one foreign-born parent (2nd-generation).

Age: expressed in years.

Sex: male / female

GP-training institutes: Amsterdam UMC (AMC and VUmc), Utrecht UMC, Maastricht UMC, Leiden UMC, Erasmus MC, Radboud MC, UMC Groningen

Competence areas: see Table 1

Procedure

Following the European General Data Protection Regulation (GDPR), the ERB and Privacy Officers allowed an opt-out procedure prior to the data sampling. We emailed an opt-out link

to all eligible GP-trainees and alums with announcements in GP-specialty training institutes' newsletters and at the digital Dutch GP-forum (HaWeb). We excluded all files of trainees who opted out within two months after our emails and announcements.

Thereafter, we conducted the data sampling in three phases.

In phase one, a centralized query collected data from the Dutch GP-specialty training institutes' database on the trainees' educational start date, age, sex, GP-educational institute, and the occurrence of preliminary dropout and extended educational pathways. At this stage, data were not yet completely anonymized since Statistics Netherlands required the associated professional registration numbers to add details on ethnicity.

In phase two, we reviewed all files from trainees who encountered preliminary dropout and/or extended educational pathways to obtain information unavailable in the centralized database on mandatory coaching pathways and specific underperformance areas. These reviews at the regional educational institutes allowed us to discuss doubtful file documentation with local assessors. Subjects of these discussions were (1) the validity of analyzing separate competence areas commonly confused by assessors and (2) some dropouts apparently by choice, on closer reflection aligned with the institutes' urgent recommendation. Based on these discussions, we decided that (1) clustering commonly merged areas would add more value and (2) dropouts, seemingly upon the ambition for a different career, should be considered undesired if obviously due to well-documented insufficient academic progress. Due to Covid-19 restrictions, we could not visit all GP-specialty training institutes. Local educational coordinators of these institutes still supported our research team. To ensure consistent quality of data extraction, we developed predefined data formats and provided daily online availability for consultations.

In phase three, we transferred all secured data sets to Statistics Netherlands (the CBS), which added details on ethnicity through the birth country of the trainees and their parents and further anonymized the data sets.

Analysis

We excluded incomplete cases:

- Cases with incomplete files due to a remaining training period of three-plus months. (we did not expect unforeseen underperformance in the final three months of education; therefore, we considered those cases complete for inclusion);
- Cases from one GP-specialty training institute that could not support the researchers in completing the data through local file reviews;
- Cases with missing key information for Statistics Netherlands (CBS) to indicate ethnicity.

We checked for selective dropout through an independent T-Test (for continuous variables) and Chi-square test (for categorical variables) comparing the population characteristics of the eliminated missing data cases to the complete cases. We performed descriptive analyses and determined mean and standard deviation (std.), a median and interquartile range for continuous characteristics, and number and percentages for categorical characteristics.

We performed a multilevel logistic regression analysis using a model with a random intercept and fixed variables adjusted for age and gender to examine a potential nesting effect through the hierarchical study structure with trainees nested in training institutes. If this multilevel logistic regression model would not converge and indicate a negligible nesting effect, we would continue with a single-level logistic regression model. To assess (clustered) competence areas as a potential field of underperformance, we used Chi-square. Additionally, we explored possibly different performance outcomes in 1st- and 2nd-generation migrant trainees using the procedures mentioned above for logistic regression analyses.

We performed all analyses in the highly secured environment of Statistics Netherlands (CBS) using the Statistical Package for Social Sciences (SPSS IBM Corp. Armonk, NY version 26). We considered a value of $p < .05$ statistically significant for all analyses based on two-sided testing.

Ethics

The use of sensitive personal data on ethnicity was inevitable in this study. We took measures to protect the integrity of anonymizing, transfer, storage, and responsibilities in every possible lawful and ethical way. Statistics Netherlands took responsibility for anonymizing and non-traceability to individuals in a secured environment. Only the research team had access to this environment for analysis, and the team could not export data. After completing this study, Statistics Netherlands will keep the data for ten years in their secured environment to enable scientific verification.

The Ethical Review Board (ERB) of the NVMO (Dutch Association for Medical Education) and the Privacy Officers of all participating institutes carefully reviewed and approved the research protocol based on the GDPR and Dutch legislation. These statutes support opt-out procedures for extensive research populations conditional on a strict focus on solving critical societal issues or re-establishing equal opportunities for potentially underserved populations.

Results

Study population

We collected data on the assessed performance of 1870 trainees from seven Dutch GP-specialty training institutes and excluded 170 cases; five due to opt-out, 18 because of missing information, and 147 with incomplete educational pathways due to a remaining training period of three-plus months. We eliminated the five opt-outs prior to our analysis and considered the 165 excluded cases missing cases. A selective dropout analysis showed that

GP-specialty training institute, ethnicity, and age did not significantly differ from the included cases. A large proportion of the trainees excluded due to a remaining training period of three months or more had started their education in 2017 (86%) and were females (91%). Personal circumstances such as maternity leave, illness, or participation in research projects had caused their delays. The small percentage of missing cases (9%), the absence of selective ethnicity dropout, and adjustment for sex and age in the analysis legitimized a complete-case analysis (CCA) on 1700 included cases and deleting missing cases list-wise.

The minority trainee percentage was 17.4%. Minority trainees were more often males (34.1% vs. 28.3%, $p < .05$) of higher age than the majority group (29.9, SD = 3.2 vs. 28.6 years, SD = 4.2, $p < .001$; Table 2).

Underperformance events occurred in 154 GP-trainees (9.1%) and minority trainees were significantly overrepresented (17.9% vs. 7.2%, $p < .001$). These events included 1.4% of the overall population who preliminary dropped out; 11.1% extended educational pathways among minority trainees versus 4.9% among majority trainees ($p < .001$); and 15.5% mandatory coaching pathways among minority trainees versus 6.2% among majority trainees ($p < .001$), upon binding advice of the GP-training institute. Most trainees (minority and majority trainees), with underperformance events, experienced more than one event.

Additionally, Table 2 shows that 2nd-generation minority trainees outnumbered 1st-generation (66.2% vs. 33.8%). Male trainees were stronger represented in the 1st-generation than in the 2nd-generation (43% vs. 29.6%). The mean age of 1st-generation minority trainees was significantly higher than the 2nd-generation (31.6 years, SD = 4.87 vs. 28.9 years, SD = 3.57, $p < .001$).

Risk of underperformance: minority vs. majority trainees

Differences between the participating GP-specialty training institutes could explain only a minor proportion (0.8%) of the outcome variance (ICC: 0.008). With this non-convergent multi-level regression analysis, we decided to continue using a single-level analysis.

Table 3 shows that minority GP-trainees were more likely to face underperformance assessments than those from the majority group (OR 2.82 (95% CI: 1.97 – 4.05). When adjusted for age and sex, the odds ratio for underperformance in ethnic minority trainees compared to the majority group was 2.41 (95% CI: 1.67 – 3.49). Higher age (1.10 (1.06 - 1.15) and male sex 1.61 (1.13 - 2.28) were independent risk factors for underperformance.

Competence areas

Perspectives of educational coordinators indicated that assessors tended to merge some competence areas. In line with these assessments, we clustered: '*clinical knowledge*' with '*academic skills*,' and '*organizational skills* with *teamwork skills*' and '*social accountability*' (Tables 1 and 6). Underperformance assessments in trainees from ethnic minorities were not significantly more often nested in particular (clustered) competence areas (Table 4).

1st generation minority trainees vs. 2nd generation minority trainees

After adjusting for age and sex, 1st-generation minority GP-trainees 4.02 (2.45 – 6.61) had a greater risk to be assessed as underperforming than the 2nd-generation 1.65 (1.01 – 2.68), both compared to majority GP-trainees (Table 5).

Discussion

Summary

In this study, we analyzed quantitative data on underperformance events of 1700 GP-trainees at seven Dutch GP-specialty training institutes (17.4% minority trainees). Minority trainees were more likely to face underperformance assessments. Moreover, 1st-generation minority trainees seemed to be more at risk than their 2nd-generation peers. We found male and older

age to be independent risk factors. There were no significant differences per (clustered) competence area(s).

Strengths and limitations

Underperformance in GP-specialty training is a composite variable, indicated by (1) formally documented doubts about the trainee's educational progress by teachers and GP-trainers and (2) recurrently poor test scores (or low scores in more than one area). In our setting, most of these teachers' doubts and performance test results (such as the consultation video test (MAAS Global) and the Competency Assessment List (ComBel) were stored in paper files with varying accuracy. Analyzing these variables would have led to multiple missing data. Therefore, we measured the outcome (underperformance) by the occurrence of well-documented underperformance events. Still, retrospectively assessing events - even if carefully judged and documented - had its limitations and may have been susceptible to observer bias. We addressed this risk through predefined data formats and daily online consultation availability. Also, we extensively discussed definitions of '*underperformance-related events*,' '*competence areas*,' and '*upon the binding advice of the training institute*' with educational coordinators at the local GP-training institutes.

In line with the official Statistics Netherlands definition, this study defined '*belonging to an ethnic minority*' as foreign-born or born from at least one foreign-born parent. Since the Netherlands has no indigenous minorities, this determination may, from the international point of view, be equivalent to '*people with a migration background*.' Limiting our definition to the trainees' or their parents' country of birth may have failed to do justice to the trainees' self-reported sense of belonging to an ethnic minority group(20). We carefully reflected on this issue and decided that our Dutch study setting required adhering to the official Dutch terminology.

The Netherlands has always been an immigration country. In many aspects, the Dutch GP-specialty training is comparable to most European, British, US, and Australian GP-specialty training programs. It shares characteristics and values (e.g., a solid academic basis, 3-4 year dual-track program, competence-based approach, and longitudinal assessments(21, 22)). Therefore, we consider the Dutch GP-specialty training a relevant research setting with results beneficial in a broader context for analyzing educational opportunities in minority populations.

Comparison literature

Although we found no significantly different underperformance in specific (clustered) competence areas, UK research showed that minority GP-trainees have difficulties in detailed clinical skills assessments(16). A Dutch pilot interview study suggested that GP-trainees from ethnic minority groups may end up in mandatory coaching pathways or fail more often than their peers from the majority group(17). In line with these studies, our results support the conclusion that ethnic disparities may prevail in the GP-specialty training.

Previous studies showed that language is critical in written exams and clinical GP-communication-based tests. Also, mastering the language of instruction as a second language could lead to passive behavior in discussions, missing out on essential details, or feelings of not fitting in (23). In our study, most ethnic minority trainees were 2nd-generation and native Dutch speakers. GP-specialty training institutes required a high-level professional entrance assessment in Dutch. Although we did not find any significant differences in assessed communication skills, it is not unthinkable that Dutch as a non-native language and cultural differences (particularly in 1st-generation minority trainees) may have played a role.

In a systematic review, Isik et al. distinguish intrinsic and extrinsic motivational factors for academic growth. Intrinsic factors were self-efficacy, confidence, learning-related emotions,

personal characteristics and experiences, and ethnic identity and orientation, while learning climate was an essential extrinsic factor (24). Ethnic minority students were more sensitive to both types of motivational factors. Therefore, we recommend action research with interventions focusing on intrinsic and extrinsic motivational factors to enhance equal educational opportunities.

Qualitative studies found feelings of being isolated (25), absent academic support networks(26), and insufficient understanding of cultural differences in the trainer-trainee relationships(27) as risk factors (28, 29). Future qualitative studies on equal academic opportunities should also focus on these issues.

Implications for further research and practice

The low dropout rate of GP-trainees combined with a higher mandatory coaching pathway and extended trajectory rate suggests that these interventions could bend the trainees' learning curve towards successful completion. Nevertheless, performance assessments in this study were significantly different for minority trainees. Despite the selective admission procedure ensuring an expected shared entrance qualification level, belonging to an ethnic minority group is associated with increased odds for events of assessed underperformance.

Since this study is the first quantitative study in the Netherlands on this subject, Dutch GP-specialty training institutes have not yet implemented any structured policies for equal opportunities for ethnic minority trainees. Therefore, we recommend further qualitative research on underlying factors and undesirable educational barriers (e.g., potential assessment bias), followed by participatory research involving all stakeholders (trainees, teachers, tutors, and staff) to develop and implement appropriate interventions for an inclusive learning climate with equitable success opportunities.

Tables

Table 1: Competence areas, corresponding CanMEDs, and description

Competence area	Corresponding CanMEDs	Description
Clinical knowledge and expertise	Medical expert	Interprets the patients complaints in his/her context. Applies diagnostic, therapeutic, and preventive ranges purposeful and evidence-based.
Academic skills	Scholar	Promotes knowledge development and implementation. Facilitates expertise of students, postgraduates, and colleagues.
Communication skills	Communicator	Adequately applies communication techniques and skills. Actively involves patients in the decision making process.
Organisational skills	Manager	Applies appropriate organisational and management principles. Utilizes information technology for optimal patient care.
Teamwork skills	Collaborator	Participates in intra- and interdisciplinary teamwork. Contributes to the health of individual patients and patient groups.
Social accountability	Health advocate	Acts in accordance with legislation, cost-consciously, and socially involved.
Professional integrity	Professional	Balances personal and professional roles Works consistently on improving professional skills

Table 2: Characteristics of the study population

	Trainees from the majority group (n=1404, 82.6%)		Trainees from 2 nd -generation minority groups (n=196, 66.2%)		Trainees from 1 st -generation minority groups (n=100, 33.8%)		TOTAL minority population (n=296, 17.4%)		P-value	TOTAL study population (n=1700)	
	N	%	N	%	N	%	N	%		N	%
Sex											
Female	1007	71.7	138	70.4	57	57	195	65.9		1202	70.7
male	397	28.3	58	29.6	43	43	101	34.1		498	29.3
Age at start GP-specialty training											
Mean age (in years), SD			28.9, SD 3.57		31.6, SD 4.87		29.9, SD 4.24		<.001	28.9, SD 3.40	
GP-specialty training institute											
1	210	15.0					54	18.2		264	15.5
2	206	14.7					21	7.1		227	13.4
3	161	11.5					35	11.8		196	11.5
4	209	14.8					57	19.3		266	15.6
5	243	17.3					37	12.5		280	16.5
6	164	11.7					41	13.9		205	12.1
7	211	15.0					51	17.2		262	15.4
Start year of training											
2015	501	35.7	66	33.7	37	37.0	103	34.8		604	35.5
2016	492	35.0	75	38.2	34	34.0	109	36.8		601	35.4
2017	411	29.3	55	28.1	29	29.0	84	28.4		495	29.1
Occurrence of predefined underperformance events											
Underperformance (one or more events)	101	7.2					53	17.9	<.001	154	9.1
Mandatory coaching pathway	87	6.2					46	15.5	<.001	133	7.8
Extension of education	69	4.9					33	11.1	<.001	102	6.0
Preliminary dropout ¹	-	-					-	-	-	23	1.4

¹ The number of preliminary dropouts prompted by the educational institute in the overall study population was too small to analyze its proportions for minority and majority trainees without infringing the strict Privacy Protection Rules that applied to this study.

Table 3: Risk of being assessed as underperforming in GP-trainees from minority groups compared to trainees from the majority group (N = 1700, logistic regression model without random effects, adjusted for age and sex)

	Underperformance Odds Ratio (95% CI)	P-value	Std. error
Ethnic minorities	2.82 (1.97 – 4.05)	<.001	.18
Independent risk groups			
Age	1.10 (1.06 - 1.15)	<.001	.02
Sex	1.61 (1.13 - 2.28)	.008	.18
Adjusted for age and sex			
Ethnic minorities	2.41 (1.67 - 3.49)	<.001	.19

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Table 4: Insufficiently assessed competence areas in trainees who faced 1 or more events of underperformance in trainees from minority groups and the majority group

	Trainees from the majority group (n=1404, 82.6%)		Trainees from minority groups (n=296, 17.4%)		P-value	TOTAL study population (n=1700)	
	N	%	N	%		N	%
Trainees who faced one or more events of assessed underperformance	101	7.2	53	17.9	<.001	154	9.1
Insufficiently assessed competence areas in trainees who faced underperformance events							
Communication skills	54	3.8	34	11.5	.20	88	5.2
Combined - social: - Organisational skills - Teamwork skills - Social accountability	43	3.1	27	9.1	.32	101	5.9
Professional integrity	67	4.8	34	11.5	.79	70	4.1
Combined – academic/clinic: - Clinical knowledge/expertise - Academic skills	50	3.6	29	9.8	.54	79	4.6

Table 5: Risk of being assessed as underperforming in GP-trainees from 1st- and 2nd-generation minority groups compared to trainees from the majority group (N = 1700, logistic regression model without random effects, adjusted for age and sex)

	Underperformance Odds Ratio (95% CI)	P-value	Std. error
2 nd -generation minorities	5.53 (3.45 – 8.88)	<.001	.24
1 st -generation minorities	1.72 (1.06 – 2.77)	.028	.25
Independent risk groups			
Age	1.09 (1.05 – 1.14)	<.001	.02
Sex	1.57 (1.10 – 2.23)	.012	.18
Adjusted for age and sex			
2 nd -generation minorities	1.65 (1.01 – 2.68)	.045	.25
1 st -generation minorities	4.02 (2.45 – 6.61)	<.001	.25

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