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Medical laboratory technicians' job satisfaction in Generations X, Y, and Z: Findings from an online survey in Austria

Arbeitszufriedenheit österreichischer biomedizinischer Analytiker*innen in den Generationen X, Y und Z: Ergebnisse einer Online-Umfrage aus Österreich

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Abstract

Goal: Medical laboratory technicians (MLTs) play an essential role in health care, and the profession has to deal increasingly with staff shortages. Consequently, retention of employees has become a crucial issue. So far, little attention has been paid to generational differences in factors regarding job satisfaction of MLTs, and comparatively few studies have included the youngest cohort of Generation Z. The aim of this study was to analyse aspects of MLTs' job satisfaction from a generational perspective and to identify potential for improvement according to the different generations studied.
Methods: A cross-sectional online survey study design was used. A total of 382 MLTs completed the online survey of which 371 met the eligibility criteria and were assigned to one of the three generational cohorts. The analysis focused on several aspects of job satisfaction, the gap between the perceived relevance and realization of these aspects, and factors influencing job satisfaction by generation.
Principal findings: For all aspects of job satisfaction, and across all generations, realization was rated worse than importance. Recognition represents the most important influencing factor for job satisfaction, but other aspects are specifically relevant to one of the three generations, such as relationships for Generation X, meaningful contribution for Generation Y, and income for Generation Z.
Practical applications: The various aspects of job satisfaction show commonalities and differences between the three generations. Employers and professional associations can draw on these findings to positively influence job satisfaction through generation-specific interventions to support this essential healthcare workforce.

Abstract

Ziel: Die Berufsgruppe der biomedizinische Analytiker*innen (BMAs) nimmt eine wesentliche Rolle in der österreichischen Gesundheitsversorgung ein und hat zunehmend mit Personalmangel zu kämpfen. Bislang wurde den Unterschieden zwischen den Generationen in Bezug auf die Arbeitszufriedenheit von BMAs wenig Aufmerksamkeit geschenkt und vergleichsweise wenige Studien haben die jüngste Kohorte der Generation Z miteinbezogen. Ziel dieser Studie war es, Aspekte der Arbeitszufriedenheit von BMAs aus einer Generationenperspektive zu analysieren und Verbesserungspotenziale für die verschiedenen Generationen zu identifizieren.
Methode: Es wurde eine Querschnittsstudie in Form einer Online-Umfrage durchgeführt. Von insgesamt 382 ausgefüllten Fragebögen konnten 371 Teilnehmer*innen die Zulassungskriterien erfüllen und einer der drei Generationskohorten zugeordnet werden. Die Analyse konzentrierte sich auf verschiedene Aspekte der Arbeitszufriedenheit, die Diskrepanz zwischen der wahrgenommenen Relevanz und der Umsetzung dieser Aspekte sowie auf Faktoren, die die Arbeitszufriedenheit nach Generationen beeinflussen.
Ergebnisse: Bei allen Aspekten der Arbeitszufriedenheit und über alle Generationen hinweg wurde die Erfüllung schlechter bewertet als die Wichtigkeit. Anerkennung stellt den wichtigsten Einflussfaktor für die Arbeitszufriedenheit der gesamten Stichprobe dar. Entlang der drei Generationen werden unterschiedliche Aspekte als wichtig erachtet, wie Beziehungen für die Generation X, ein sinnvoller Beitrag für die Generation Y und das Einkommen für die Generation Z.
Conclusion: Die verschiedenen Aspekte der Arbeitszufriedenheit zeigen Gemeinsamkeiten und Unterschiede zwischen den drei Generationen. Arbeitgeber*innen und Berufsverbände können sich diese Erkenntnisse zunutze machen, um die Arbeitszufriedenheit durch generationsspezifische Maßnahmen zur Unterstützung dieser essenziellen Arbeitskräfte im Gesundheitswesen positiv zu beeinflussen.

Keywords

Job satisfaction – medical laboratory technicians – healthcare professionals – online survey – Generations X, Y, and Z

Keywords

Arbeitszufriedenheit – Biomedizinische Analytiker*innen – Gesundheitsberuf – Online-Umfrage – Generationen X, Y, und Z

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INTRODUCTION AND RESEARCH QUESTION

Medical laboratory technicians (MLTs) play an essential role in health care. On a daily basis, they prepare and process body fluids, like blood or liquor, human tissues, or test body functions like lung function. Therefore, they build the bridge between laboratory testing and the clinical diagnosis of a patient by providing valid and accurate health data. MLTs mainly work at public hospitals and private healthcare facilities, but also in research and governmental institutions. The work of MLTs predominantly takes place behind the scenes, as there is usually no direct patient contact. Like all other healthcare professionals MLTs have become more visible during the coronavirus pandemic (COVID-19) as the PCR (polymerase chain reaction) testing falls within their scope of work.

Staff shortage in the medical field is an evolving problem worldwide. Both earlier and more recent studies show acute staff shortages in the field of laboratory medicine (Halstead & Sautter, 2023; Leber et al., 2022; The National Health Workforce Accounts Database, 2023). In the United States (US) the need for MLTs is expected to increase by 7% until 2031 (Bureau of Labor Statistics, 2023). Current vacancy rates for MLTs range from 4.3% to 13.1% depending on the department. Because in the US it takes approximately three to six months to fill vacant MLT positions and up to a year for supervisor positions, it has become more difficult to fill the positions with adequate staff (Rappold & Mathis-Edenhofer, 2022). Not only the US but also Canada (Tran, 2021) and the United Kingdom (UK) (Mohammedsaleh & Mohammedsaleh, 2014) have to deal with staff shortages in laboratories and its consequences. Similarly in Austria, the demand for laboratory personnel is rising steadily, with an additional staff and replacement requirement of around 1.800 employees by 2030. The reasons for this increasing demand are the demographic growth of the population, leading to more patients, a large wave of MLT retirements, a rising intramural demand trend, changes towards part-time employment, and the intention to level off regional differences (Rappold & Mathis-Edenhofer, 2022).

The MLT profession is likely to gain in importance (Rappold & Mathis-Edenhofer, 2022). For the functioning of laboratories and hospitals, MLTs not only have to be sufficiently available, but also understood and supported in order to ensure a high degree of job satisfaction and retention. Job satisfaction has a major impact on the well-being and turnover rate of the hospital staff (Zhang & Feng, 2011). To date, job satisfaction has been investigated mainly for healthcare workers in general (Barili et al., 2022; Cantarelli et al., 2023; Goula et al., 2022; Kvist et al., 2013; Singh et al., 2019; Yue et al., 2022) or for nurses (Parveen et al., 2017) and physicians (Zhang & Feng, 2011). Recent research on overall job satisfaction specifically of MLTs is limited. The existing studies on MLTs refer to several factors positively influencing job satisfaction, such as relationships with colleagues (Al-Qathmi & Zedan, 2021; Alrawahi et al., 2020; Dellie et al., 2019), with supervisors (Al-Qathmi & Zedan, 2021), and with other healthcare professionals (Garcia et al., 2020; Kenwright, 2018); the recognition of the profession (Alrawahi et al., 2020; Dellie et al., 2019; Garcia et al., 2020); and salary (Al-Qathmi & Zedan, 2021; Alrawahi et al., 2020; Garcia et al., 2020). Furthermore, opportunities for educational (Alrawahi et al., 2020) and professional (Al-Qathmi & Zedan, 2021) advancement are often missing, but if in place contribute to retention of MLTs (Dellie et al., 2019; Marinucci et al., 2013). While these findings are shedding light on job satisfaction factors in general, previous research has not yet provided sufficient insight into generational patterns regarding the job satisfaction of MLTs.

Focusing on different age groups or generations and the status of their needs and their sense of fulfilment of several aspects of job satisfaction makes it possible to portray the diversity within the profession and to identify tailored interventions and strategies to increase the intention of MLTs to stay with an employer or in the profession. A generation can be defined as a group of individuals born within the same historical and socio-cultural context, who experience similar formative experiences and develop unifying commonalities as a result (Mannheim, 1952). Mainly focusing on mean differences among birth cohorts (Lyons & Kuron, 2014), researchers investigating work values and work attitudes found that leisure values increased with successive generations, whereas work centrality declined (Wray-Lake et al., 2011), corresponding with a decrease in overall commitment (Costanza et al., 2012). The relevance of status declined, but the importance of aspects such as compensation, security, and working conditions as well as creativity and responsibility increased (Wray-Lake et al., 2011). Other aspects such as intrinsic or altruistic work values (Wray-Lake et al., 2011) or achievement and safety values (Hansen & Leuty, 2012) remained similarly important.

Previous research on generational differences in healthcare workers investigated mainly nurses and focused on Baby Boomers, Generation X, and Generation Y. These studies have established that Generation Y nurses have a higher intention to leave than Baby Boomers and Generation X nurses (Koehler & Olds, 2022; Stevanin et al., 2018; Tourangeau et al., 2013). In contrast to Baby Boomers, Generation Y nurses perceived higher stress and were less attached to their job (Stevanin et al., 2018); they also preferred higher pay over additional vacation time as an incentive to remain employed The generation of Baby Boomers believed themselves to have more competence,

autonomy, and control over practice than the other two generations; they were found to be more involved and less likely to leave (Stevanin et al., 2018). Career advancement was regarded as more important for the younger cohorts (Koehler & Olds, 2022). Irrespective of the generational cohorts, all nurses regarded reasonable workload and adequate staffing as most relevant regarding their intention to stay or to leave and further indicated the importance of home or personal life for these decisions.

So far, little attention has been paid to generational differences in factors regarding job satisfactions of MLTs and comparatively few studies have included the youngest cohort of Generation Z. We address both issues in our study. The aim of this study was to analyse aspects of MLT job satisfaction from a generational perspective and to identify potential for improvement. The paper is organized in three steps that lead to a better understanding of generational differences and similarities. Firstly, the satisfaction with several aspects of the job is outlined. Secondly, the gap between the relevance and realization of these aspects is examined, and finally the factors influencing job satisfaction are addressed.

METHODS

Design

A cross-sectional online survey study design was used. The questionnaire was very much based on the questionnaire by Kulnik et al. (2022), which has been applied before to investigate aspects of job satisfaction among physiotherapists (Latzke et al., 2021). The questionnaire was created using the online survey tool EFS (Tivian XI GmbH, n.d.) and sent to the target group via an online link. In a pre-test, a group of 10 MLTs, who differed in age and education level, helped to identify comprehension and technical issues. In 2020 6,290 MLTs were recorded in the health professions registry (Holzweber, L. et al., 2021). As a result of the support of the Austrian professional association *biomed austria*, it was possible to send the final questionnaire using a newsletter to 2,700 MTLs all over Austria who are members of the professional association. In addition, five Austrian Universities of Applied Sciences offering the course of studies in biomedical science sent the questionnaire to their alumni. Furthermore, it was suggested that all persons who received the questionnaire forward it to other MLTs. The survey was completed anonymously. Therefore, it is not possible to clearly define how many people ultimately received the questionnaire and no response rate can be calculated. The completion rate was 60.4%; 255 did not complete the questionnaire and have not been included. Eligibility criteria were membership in the MLT professional group and affiliation with the relevant generations (X, Y, and Z), which led to a further reduction of 18 participants who did not meet these criteria. The online survey was accessible from the end of February in 2022 to the beginning of April in 2022. The questionnaire followed ethical research practice as expressed in the Declaration of Helsinki with voluntary and anonymous participation and advanced information about the study and the content included in the survey invitation (WMA Declaration of Helsinki – Ethical Principles for Medical Research Involving Human Subjects, 2018).

Measures

The present study's questionnaire consists of items considering general job satisfaction and potential influencing factors using a seven-point Likert scale: '1 = does not apply to me at all' and '7 = applies fully to me'. Items were drawn from job satisfaction questionnaires used in previous studies on MLTs such as autonomy (Al-Qathmi & Zedan, 2021), recognition (Alrawahi et al., 2019; Dellie et al., 2019), working times, and stress (Garcia et al., 2020). Mentoring and peer support was added because of the potential importance for the generations and the relevance it had in related health professions (Latzke et al., 2021). The importance and fulfilment of additional factors were also surveyed using a seven-point Likert scale, which measured on the basis of '1 = unimportant' to '7 = very important' and '1 = not at all realised' to '7 = fully realised'. The five items included represent the relevant dimensions of career success found by Briscoe et al. (2012) in a cross-cultural study: income, positive relationships, positive impact, work–life balance, and learning and development. In contrast to the original concept (Mayrhofer et al., 2016), entrepreneurship and financial success are not included because of their weak applicability in this context. However, a sixth item focusing on leadership support was added as a result of the pivotal role of supervisors for job satisfaction shown in previous studies on MLTs (Alrawahi et al., 2019; Singh et al., 2019). Furthermore, socio-demographic aspects such as age, gender, marital status, and working hours, as well as area of professional practice and place of work were surveyed.

Generational age cohort represented our main variable for comparing the groups in focus in the current study. Using the Pew Research Center's definition for generations, the relevant indicator was age of participants when completing the survey (Pew Research Center, 2018). Generation X was defined as those born in 1965 through 1980 with ages from 42 to 57 years; Generation Y as those born in 1981 through 1996, aged 26 to 41 years; and Generation Z as those born in 1997 or later up to 25 years of age at the time of the survey.

Data analysis

Responses were exported to Microsoft Excel and SPSS statistical software. Outcomes were descriptively reported as mean or median, with standard deviation (SD) or interquartile range (IQR) as dispersion measure, and categorical variables by absolute and relative frequencies. The various job satisfaction aspects were compared between the three age-related generational cohorts, Generation X, Generation Y, and Generation Z, applying analysis of variance (ANOVA) with no subsequent contrast or post-hoc tests. The respective effect size ω^2 was calculated, where values of 0.01 represented small, 0.06 medium and 0.14 large effects (Ferguson, 2016). When the assumption of homogeneity of variances was violated (indicated by a Levene's test p-value < 0.05) Welch's tests delivered within-group degrees of freedom, test statistic F, and overall p-value.

Discrepancies between importance and realization of job satisfaction aspects were calculated by Wilcoxon tests. The test statistic r was calculated as z/sqrt(n) and interpreted as small with 0.1, medium with 0.3, and large with 0.5 (Cohen, 1988).

In order to identify predictors of general job satisfaction for all three generations, multiple linear regressions were used. The above-described potential influencing factors were selected as independent variables, and predictors that were least useful were removed by backward elimination. Durbin–Watson statistics were calculated to assess the absence of autocorrelation. Thereby, a value of 2 displays the total absence of autocorrelation and values between 1.5 and 2.5 were regarded as acceptable. With the aim of measuring collinearity, inflation across predictors' variance inflation factors (VIF) were calculated. The report is organized using tables with details referring to the constant, predictors, and overall model statistics. Alpha was set at 0.05, and exact p-values have been reported.

RESULTS

Characteristics of the sample

Table 1 shows overall characteristics of the sample. A total of 382 participants, representing 5.5% of the total population of MLTs registered in Austria, fully completed the online survey of which 371 were assigned to one of the three generation groups. Among these, 110 belonged to Generation X, 170 belonged to Generation Y, and 91 belonged to Generation Z. The mean gender distribution of the included MLTs (94.1% women) corresponded closely to the actual distribution (93%

Table 1: Characteristics and workplaces of the samples of Gen X (n = 110), Gen Y (n = 170) and Gen Z (n = 91) MLTs.

	Gen X	Gen Y	Gen Z	Total
Characteristics				
Female, n (%)	102 of 110 (92.7%)	159 of 170 (93.5%)	88 of 91 (96.7%)	349 of 371 (94.1%)
Having children, n (%)	90 of 110 (81.8%)	58 of 170 (34.1%)	1 of 90 (1.1%)	149 of 371 (40.2%)
Weekly working hours, mean (SD)	33.9 (7.39)	34.63 (8.13)	36.46 (7.31)	34.87 (7.76)
Workplaces: institution (multiple assignments possible)				
Public hospital n (%)	80 of 110 (72.7%)	111 of 170 (65.3%)	63 of 91 (69.2%)	254 of 371 (68.5%)
University n (%)	17 of 110 (15.5%)	21 of 170 (12.4%)	9 of 91 (9.9%)	47 of 371 (12.7%)
Private laboratory n (%)	6 of 110 (5.5%)	23 of 170 (13.5%)	16 of 91 (7.6%)	45 of 371 (12.1%)
Private hospital n (%)	5 of 110 (4.5%)	10 of 170 (5.9%)	2 of 91 (2.2%)	17 of 371 (4.6%)
Research institute n (%)	4 of 110 (3.6%)	0 of 170 (0%)	4 of 91 (4.4%)	8 of 371 (2.2%)
Workplaces: department (multiple assignments possible)				
Central laboratory n (%)	36 of 110 (32.7%)	50 of 170 (29.4%)	27 of 91 (29.7%)	113 of 371 (30.5%)
Haematology n (%)	29 of 110 (26.4%)	27 of 170 (15.9%)	28 of 91 (30.8%)	84 of 371 (22.6%)
Immunohematology n (%)	23 of 110 (20.9%)	32 of 170 (18.8%)	16 of 91 (17.6%)	71 of 371(19.1%)
Molecular biology n (%)	8 of 110 (7.3%)	31 of 170 (18.2%)	19 of 91 (20.9%)	58 of 371 (15.6%)
Immunology n (%)	16 of 110 (14.5%)	17 of 170 (10%)	14 of 91 (15.4%)	47 of 371 (12.7%)
Functional diagnostics (cardiology, neurology, pneumology) n (%)	18 of 110 (16.4%)	11 of 170 (6.5%)	11 of 91 (12.1%)	40 of 371 (10.8%)
Microbiology n (%)	7 of 110 (6.4%)	20 of 170 (11.8%)	14 of 91 (15.4%)	41 of 371 (11.1%)
Histology n (%)	8 of 110 (7.3%)	17 of 170 (10%)	9 of 91 (9.9%)	34 of 371 (9.2%)

MLT… Medical Laboratory Technician, n represents the number of observations

Table 2: Aspects of job satisfaction in Gen X (n = 110), Gen Y (n = 170), and Gen Z (n = 91) MLTs.

	Gen X (mean, sd)	Gen Y (mean, sd)	Gen Z (mean, sd)	Degrees of freedom (between, within)	F	p	ω^2	Effect of size interpretation
Overall job satisfaction	4.88 (1.63)	4.66 (1.65)	5.32 (1.55)	2, 368	4.899	.008	.02	small
Autonomy	4.03 (1.87)	4.27 (1.76)	4.74 (1.75)	2, 368	3.983	.019	.02	small
Recognition	4.14 (2.06)	3.99 (1.93)	4.34 (1.96)	2, 368	.949	.388	.00	negligible
Mentoring and peer support	4.25 (2.11)	4.18 (1.87)	4.93 (1.84)	2, 368‡	4.875	.008	.02	small
Working times satisfaction	5.50 (1.54)	5.45 (1.61)	5.53 (1.58)	2, 368	.073	.930	.00	negligible
Stress	5.17 (1.64)	5.02 (1.63)	4.51 (1.64)	2, 368	4.530	.011	.02	small
Income – realization	5.14 (1.52)	4.71 (1.58)	5.49 (1.45)	2, 368	8.278	<.001	.04	small
Work-life balance – realization	4.31 (1.66)	4.55 (1.74)	5.00 (1.67)	2, 368	4.197	.016	.02	small
Positive impact – realization	5.31 (1.76)	5.30 (1.52)	5.66 (1.39)	2, 368‡	1.771	.172	.00	negligible
Positive relationships realization	5.10 (1.52)	5.25 (1.28)	5.43 (1.49)	2, 368	1.346	.261	.00	negligible
Learning and development – realization	4.31 (1.75)	4.11 (1.85)	4.32 (1.66)	2, 368	0.629	.534	.00	negligible
Supervisors - realization	4.22 (1.97)	4.24 (1.89)	4.63 (2.03)	2, 368	1.432	.240	.01	small

p-values derived from overall analysis of variance (ANOVA) with effect sizes ω^2 - interpretation: ω^2 .01, .06 and .14 represents small, medium, and large effects, respectively (Ferguson, 2016).

Variables self-rated on a 7-point Likert scale where 7 reflects the most positive outcome.

‡ Violation of the assumption of homogeneity of variances (Levene's test p-value <.05), and hence within-group degrees of freedom, test statistic F, and overall p-value derived from Welch's test.

women) (Rappold & Mathis-Edenhofer, 2022) in this profession. In Generation X, more than 80% had at least one child, whereas the whole sample had children at a rate of 40.2%. The average weekly working hours were almost 35 hours, with Generation Z having the most (36 hours), and Generation X having the least (33 hours) (Table 1). Most participants worked in public hospitals; the remainder were distributed among the private sector and/or research institutions. Participants reflected the most common disciplines (e.g., central laboratory, haematology, immuno-haematology, molecular biology) (Table 1). Therefore, the sample represented the heterogeneous professional group of MLTs.

Generational differences regarding aspects of job satisfaction

The mean of the overall job satisfaction is highest in Generation Z and lowest in Generation Y. Making a positive impact and working schedules score the highest average values of satisfaction in all three generation groups. The possibility of learning and development as well as autonomy are the lowest ranked aspects throughout all generations. Differences between the generations are evident in income realization, autonomy, mentoring and peer support, and work–life balance, whereby Generation Z shows the most positive outcome in those aspects. Generation Z responses indicate that they are more likely to be under stress than MLTs from the other two groups (Table 2).

Generational relevance–realization gaps in job satisfaction aspects

The gaps between the importance and realization of specific factors contributing to career success show different medium and large effects across all three generations (Table 3). The median importance is continuously above the median realization for all factors. Generation Y shows large gaps mostly between importance and realization. In Generation X and Z, only one to two factors show large gaps, the remaining factors present medium gap effects. Relationships and having a meaningful contribution are the only two factors that show the same medium gaps between importance and realization over all three groups.

Generation Z shows medium discrepancies in all aspects except learning and development, where a large gap between importance and realization can be assumed. Regarding this aspect, a large discrepancy also exists for Generation Y, whereas participants in Generation X perceive a lower gap between importance and realization.

Table 3: Gap between importance and realization in aspects of career success (Mayrhofer et al., 2016).

	Importance (median, IQR)	Realization (median, IQR)	z	p	r	Effect size interpretation
Gen X (n = 110)						
Relationships	7 (6.7)	5 (4.6)	-6.78	<.001	-0.46	medium
Learning and development	7 (6.7)	4 (3.6)	-6.98	<.001	-0.47	medium
Work-life balance	7 (6.7)	4.5 (3.6)	-7.68	<.001	-0.52	large
Income	7 (6.7)	5.5 (4.6)	-5.82	<.001	-0.39	medium
Meaningful contribution	7 (6.7)	6 (4.7)	-6.01	<.001	-0.41	medium
Supervisors	7 (6.7)	4 (2.6)	-7.42	<.001	-0.50	large
Gen Y (n = 169)						
Relationships	7 (6.7)	5 (5.6)	-8.88	<.001	-0.48	medium
Learning and development	7 (6.7)	4 (3.6)	-9.85	<.001	-0.54	large
Work-life balance	7 (7.7)	5 (3.6)	-9.59	<.001	-0.52	large
Income	7 (6.7)	5 (4.6)	-9.96	<.001	-0.54	large
Meaningful contribution	7 (6.7)	6 (4.7)	-7.50	<.001	-0.41	medium
Supervisors	7 (6.7)	4 (2.75.6)	-9.78	<.001	-0.53	large
Gen Z (n = 91)						
Relationships	7 (6.7)	6 (5.7)	-5.76	<.001	-0.43	medium
Learning and development	7 (5.7)	4 (3.5)	-7.05	<.001	-0.52	large
Work-life balance	7 (7.7)	5 (4.6)	-6.53	<.001	-0.48	medium
Income	7 (6.7)	6 (5.7)	-4.96	<.001	-0.37	medium
Meaningful contribution	7 (6.7)	6 (5.7)	-2.81	.005	-0.21	medium
Supervisors	7 (6.7)	5 (3.6)	-5.91	<.001	-0.44	medium

p-values derived from Wilcoxon-tests with test statistic r calculated as z/sqrt(n), where n represents the number of observations – interpretation: r .1, .3 and .5 represents small, medium, and large effects, respectively (Cohen, 1988)/ Variables self-rated on a 7-point Likert scale where 7 reflects the most positive outcome.
IQR= interquartile range.

Work–life balance shows a large gap between the older Generations X and Y; however, a lower discrepancy is seen for Generation Z. MLTs from generation X and Y indicated that supervisors are important to them, but the realization of this factor is not sufficiently high.

Main predictors of job satisfaction

All three generation types show different main influencing factors on overall job satisfaction. The strongest predictor across all three generations is recognition. The only other factor appearing in all three generations is having positive relationships at work.
The remaining factors show different effects on job satisfaction depending on the respective generation. Certain factors appear only for one generation in the model, that is, income for Generation Z, meaningful contribution for Generation Y, and supervisors, learning and development for Generation X. Others are relevant for two of the generations but not the other, such as work-life balance for X and Y, autonomy for Y and Z, and working times for X and Z (Table 4).

DISCUSSION

The objective of this study was to investigate aspects of job satisfaction for three different generations of MLTs. Besides comparing the means of these aspects, the gap between importance and realization as well as predictors for general job satisfaction have been calculated.
Since Generation Z has hardly been investigated in existing studies, insights regarding them are presented here first. Generation Z shows the highest level of general job satisfaction compared to the other two generations. They report a higher satisfaction with autonomy, mentoring and peer support, income, work–life balance and less stress. The largest gap between importance and realization is displayed in learning and development, followed by work–life balance and supervisors. The most relevant influencing factor for their job satisfaction is recognition, but working time, autonomy, relationships, and income also affect their job satisfaction. Studies show that leisure values increase with successive generations (Wray-Lake et al., 2011). This is in contrast with the findings of this research, since work–life balance does not appear as a predictor of job satisfaction for the youngest

Table 4: Predictors of overall job satisfaction in MLTs.

	b	SE b	ß	Effect size interpretation	VIF	p
Gen X (n = 110, R^2 = .69, p < .001, Durbin-Watson: 2.02)						
Constant	-0.20	0.41				.961
Recognition	0.38	0.06	.48	medium	2.06	<.001
Relationships – realization	0.32	0.68	.30	medium	1.47	<.001
Working times satisfaction	0.19	0.06	.18	small	1.21	.003
Work Life Balance – realization	0.17	0.07	.18	small	1.27	.014
Supervisor – realization	-0.13	0.59	-.16	small	1.84	.034
Learning and development – realization	0.11	0.06	.12	small	1.47	.073
Gen Y (n = 169, Corr. R^2 = .57, p < .001, Durbin-Watson: 1.80)						
Constant	0.49	0.41				.906
Recognition	0.33	0.06	.39	medium	1.86	<.001
Relationships - realization	0.24	0.08	.18	small	1.40	.002
Autonomy	0.17	0.06	.18	small	1.58	.005
Work-life balance – realization	0.15	0.06	.17	small	1.37	.009
Meaningful contribution – realization	0.11	0.06	.11	small	1.26	.066
Gen Z (n = 91, Corr. R^2 = .60, p < .001, Durbin-Watson: 1.95)						
Constant	1.25	0.66				.061
Recognition	0.36	0.08	.45	medium	2.43	<.001
Working times satisfaction	0.25	0.07	.25	small	1.18	<.001
Autonomy	0.19	0.07	.21	small	1.52	.012
Relationships – realization	0.21	0.09	.20	small	1.54	.016
Income – realization	-.16	0.09	-.15	small	1.42	.069

Multiple linear regression with stepwise removal of least useful predictors by means of backward elimination and arranged by descending ß. Dependent and independent variables self-rated on a 7-point Likert scale where 7 reflects the most positive outcome. b = regression coefficient, SE = standard error, ß = standardised regression coefficient, VIF = variance inflation factor. Interpretation ß: .1, .3, and .5 represent small, medium, and large effects, respectively (Cohen, 1988).

generation of MLTs; it is, however, for Generations X and Y. Research found that MLTs in general are not very satisfied with their salaries (Alrawahi et al., 2020; Mergenthal & Güthlin, 2021). Compared to the other two cohorts, the high importance of income for Generation Z's job satisfaction is a distinctive factor. Accordingly, it is necessary to consider what would be an appropriate income for them that would keep them in their positions (Dellie et al., 2019).

Generation Y reports a lower general job satisfaction compared to Generation Z and lower satisfaction with mentoring and peer support and income. The gap between importance and realization is large for the aspects of supervisors, income, and learning and development. Also, a large gap can be identified for work–life balance, which is in contrast with existing studies, where work–life balance is described as fair (Garcia et al., 2020). In line with other findings, their job satisfaction is mostly influenced by relationships and autonomy (Alrawahi et al., 2019). Furthermore, work–life balance, meaningful contribution, and – as a distinctive factor – recognition are contributing factors to job satisfaction.

Generation X shows a lower level of satisfaction with work–life balance. Additionally, this generation is not satisfied with the autonomy given, which is supported for all age groups in existing papers (Marinucci et al., 2013). Also, the importance–realization gap is highest for work–life balance and supervisor. Research on MLTs' satisfaction with supervisors is inconclusive, with results in both directions, ranging from satisfied to unsatisfied (Alrawahi et al., 2019, 2020; Singh et al., 2019). As for the other two generations, recognition is a relevant influencing factor for their job satisfaction, but relationships are also important predictors. Other factors contributing to their job satisfaction are working time, work–life balance, supervisor, and learning and development.

Through the comparison of generations, commonalities and differences were identified in our analysis. Recognition has been identified as a core influencing factor for all generations, which mirrors the findings of existing studies about MLTs' job satisfaction (Alrawahi et al., 2020; Dellie et al., 2019; Garcia et al., 2020). This factor is especially addressable, since research found, that

laboratory staff remains unseen, and the needed degree of recognition is not met (Alrawahi et al., 2019; Dellie et al., 2019; Gohar & Nowrouzi-Kia, 2022; Mergenthal & Güthlin, 2021). The two younger generations perceive large gaps in learning and development, which is not the case for Generation X. Nevertheless, learning and development was listed as an important predictor for satisfaction in this generation, making it a relevant factor for all generations. Research focusing on other healthcare professionals (practicing occupational therapists, physical therapists, and speech-language pathologists) confirm that both recognition and opportunities for professional growth contribute more significantly to job satisfaction and job retention than extrinsic factors such as pay (Randolph, 2005). Therefore, it is essential to show support to this professional group, for example, in interprofessional collaboration or trough supervisors (Matsuo et al., 2020). Additionally, as opportunities for educational and professional advancement for MLTs are currently often lacking (Al-Qathmi & Zedan, 2021; Alrawahi et al., 2020), but contribute to retention if they are provided (Dellie et al., 2019; Marinucci et al., 2013), it is important to ensure the laboratory staff has the possibility for professional growth.

This is the first study that examines various aspects of job satisfaction for MLTs and illustrates commonalities and differences between three generational cohorts, including Generation X, Generation Y, and the youngest one Generation Z. Understanding aspects of job satisfaction for different generations allows employers to set measures that enhance the commitment of existing staff and tailor recruiting activities. There is a need for action to compensate for the lack of training and development opportunities. Furthermore, strengthening professional relationships between various occupational groups and with superiors and increasing recognition, for example, by increasing the media presence of the profession, could be measures that contribute to reducing fluctuation.

Potential limitations refer to a study design that is cross-sectional and therefore does not allow for interpreting causal relationships. Longitudinal or time-lagged studies have the potential to illuminate the relevance of generations more clearly and to differentiate these effects from age or experience within the field. The outcomes were self-reported and may therefore have a tendency to lean toward social desirability.

Future research on generational differences may incorporate a larger sample of Generation Z individuals and enrich our findings by conducting in-depth interviews to gain insights and uncover new influencing factors that have not been addressed in existing literature. It would be particularly interesting to explore in more depth the causes for the insufficient fulfillment of important factors, such as the lack of learning and development opportunities, and to find out what the expectations of the MLTs are in this regard. They may also investigate more distal variables than job satisfaction, such as the intention to stay. In addition, a repetition of the survey at a later point in time may be promising as comparisons can be drawn with the current impact of a pandemic, because research found out that many MLTs show decreased job satisfaction due to this special situation (Nowrouzi-Kia et al., 2022).

CONCLUSION

MLTs, as a relevant health profession, face challenges regarding staff shortage, which implies the relevance of investigating factors that affect job satisfaction and, as a consequence, retention. Our unique focus on generations allows for the identification of tailored measures. A main finding is that recognition represents the most important influencing factor for job satisfaction for all three generations. Other aspects are mainly relevant for one of the three generations, such as relationships for Generation X, meaningful contribution for Generation Y, and income for Generation Z. Employers and professional associations can draw on these findings to influence the job satisfaction of MLTs positively, by supporting this essential healthcare workforce. Management should create an optimal organizational climate for the employees, ranging from active involvement in decisions and the design of work processes in line with the needs and values of the employees, fair pay and appropriate appreciation.

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Ethical approval

The questionnaire followed ethical research practice as expressed in the Declaration of Helsinki with voluntary and anonymous participation and advanced information about the study and the content included in the survey invitation (WMA Declaration of Helsinki – Ethical Principles for Medical Research Involving Human Subjects, 2018). Since the target group were professionals and the survey anonymous, no ethical approval or informed consent was needed.

Conflicts of interest

None.

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