

Medical Humanism in Syria Before and After December 2024: A Comparative Cross-Sectional Study

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Abstract

Background: Humanism is a fundamental component of healthcare practice and encompasses values such as respect, empathy, compassion, altruism, and ethical patient care. Major national changes and prolonged periods of conflict may influence these values among healthcare professionals. This study compared medical humanity among Syrian health professional students and practitioners in samples collected before and after December 2024.

Methods: A comparative cross-sectional study was conducted using two independent samples collected from April to December 2022 and from January to July 2026. Humanistic values were assessed using the validated 27-item Medical Humanity Scale (MHS), scored on a 7-point Likert scale. Between-group differences were examined using parametric and nonparametric tests. Multiple linear regression with HC3 robust standard errors was used to adjust for demographic differences between the samples, and item-level comparisons were corrected using the Benjamini–Hochberg false discovery rate procedure.

Results: A total of 991 participants were included, with 495 in the 2022 sample and 496 in the 2026 sample. Mean total MHS scores were significantly higher in the 2026 sample than in the 2022 sample (157.52 ± 12.04 vs 155.39 ± 13.70 ; $P=0.009$), although the effect size was small (Cohen's $d=0.17$). The difference remained significant after adjustment for demographic characteristics, with the post-December 2024 sample scoring 2.01 points higher than the pre-December 2024 sample ($B=2.01$, 95% CI $0.33-3.69$; $P=0.019$). Nine MHS items remained significantly different after correction for multiple comparisons. The 2026 sample scored higher on items related to kindness, respect regardless of background, willingness to treat individuals with different opinions or beliefs, equality of care, and rejection of unethical experimentation. Lower scores were observed for reporting ethically disreputable colleagues and one item related to patient decision-making.

Conclusions: Medical humanity differed modestly but significantly between samples collected before and after December 2024. Overall MHS scores were higher in the post-December 2024 sample, although the small effect size and bidirectional item-level differences indicate that the findings should not be interpreted as a uniform improvement across all domains of medical humanism. These findings may inform medical ethics and professionalism education in Syria.

Background

Humanism refers to the constellation of virtuous qualities, principles, and beliefs that guide individuals' interactions with others without discrimination or bias (1). In professional and clinical contexts, it is commonly expressed through attributes such as integrity, excellence, compassion, altruism, respect, and empathy (2). Within medicine, these attributes are often described collectively as *medical humanity*; the terms *humanism* and *medical humanity* are used interchangeably throughout this study. Rather than being a peripheral or aspirational aspect of clinical practice, humanism is increasingly recognised as an important determinant of care quality, patient trust, and clinical outcomes (3). Its importance may be particularly pronounced in settings affected by revolution, armed conflict, and prolonged instability,

where healthcare professionals face substantial ethical, emotional, and professional pressures and where the preservation of humanistic values has important implications for patient care (4).

Syria, a lower-middle-income country, has experienced the Syrian revolution and the prolonged conflict that followed since 2011, resulting in profound consequences for its healthcare system. Healthcare infrastructure has sustained extensive damage, while shortages of medical supplies and healthcare personnel and disruptions to essential services have placed considerable strain on healthcare delivery (5, 6). The conflict has also resulted in large-scale displacement of healthcare professionals, both internally and internationally, further reducing the country's clinical workforce (5, 6). Healthcare professionals who remained in Syria have often practised under conditions characterised by resource scarcity, high patient burden, restricted referral pathways, and sustained psychological stress (5, 6). Prolonged exposure to such conditions may influence professional development, psychological well-being, and the humanistic values that underpin relationships between healthcare professionals and patients (7).

December 2024 marked a major turning point in Syria and the beginning of a substantially different national context following more than a decade of conflict and instability (8–10). The period that followed has brought renewed attention to the recovery and reconstruction of the healthcare system, including the restoration of healthcare services, rebuilding of institutional capacity, and efforts to address longstanding workforce shortages (11). Evidence from other post-conflict settings suggests that health-system recovery may support improvements in service delivery, governance, and the reintegration of displaced healthcare professionals (12, 13). However, considerably less is known about how the humanistic orientation of healthcare professionals and trainees may differ across periods of major national change (14). This question is particularly relevant in Syria, where medical education, clinical training pathways, healthcare institutions, and professional environments have been substantially affected by years of conflict and are now entering a new phase (15). Despite these circumstances, empirical evidence examining humanistic values among Syrian healthcare professionals and trainees across different periods remains limited (16).

Assessing humanistic values in this context requires a measurement instrument appropriate for the Syrian healthcare and educational environment. To address this need, our group previously developed and validated the Medical Humanity Scale (MHS), a 27-item instrument designed to assess key dimensions of humanistic patient care, including respect, empathy, altruism, ethical conduct, and compassion, using a rigorous Delphi consensus method (17). The MHS was validated among 300 students from Syrian medical, dental, and pharmacy faculties and demonstrated strong internal consistency and reliability, supporting its use as a practical and psychometrically sound instrument for assessing humanistic orientation in this population (17). Applying this instrument to samples collected during different periods provides an opportunity to examine whether patterns of medical humanity differ within a healthcare and educational system undergoing substantial change. Such evidence may have important implications for medical education, professional development, and healthcare workforce recovery in Syria (5).

Therefore, this study aimed to (1) assess humanistic attributes among students, graduates, and healthcare professionals in medical and health sciences fields in Syria using the validated Medical Humanity Scale, and (2) compare medical humanity between independent samples collected before and after December 2024, including differences in overall MHS scores and specific humanistic attributes across educational and professional groups.

Methods

Study Design

We conducted a comparative cross-sectional study to assess medical humanism among individuals in medical and health sciences fields in Syria, including students, graduates, and practising healthcare professionals. Participants were recruited from universities, colleges, and healthcare institutions across the country. The study included individuals from different academic and professional stages, ranging from undergraduate students to graduates and practising healthcare professionals.

Data were collected from two independent samples at two time points. The first sample was recruited from April to December 2022, before December 2024, and the second sample was recruited from January to July 2026, after December 2024. The 2022 sample comprised 495 participants and represented the pre-December 2024 period, whereas the 2026 sample comprised 496 participants and represented the post-December 2024 period. The same study instrument and general recruitment approach were used for both samples. Data were collected electronically to facilitate participation from different regions of Syria.

Participants and Data Collection

Participants were recruited from public and private universities and healthcare institutions across Syria. Eligible participants were individuals currently enrolled in, graduated from, or professionally working within medical and health sciences fields. The sample included participants from medicine, dentistry, pharmacy, nursing, health sciences, medical technologies, and related disciplines.

An Arabic-language electronic questionnaire was developed using Google Forms and distributed through social media groups and online platforms targeting students, graduates, and healthcare professionals across Syria. The objectives of the study were explained before participation. Participation was voluntary, and participants were informed that their responses would remain confidential. Incomplete responses were excluded from the analysis.

The study was approved by the Ethics Committee at Aleppo University (approval number: 56754) and was conducted in accordance with the Declaration of Helsinki (18).

Questionnaire

Medical humanism was assessed using the Medical Humanity Scale (MHS), developed and validated by Ataya et al. (17). The MHS comprises 27 items reflecting seven core humanistic values: respect, empathy, altruism, acceptance, consideration, appreciation, and compassion. It was designed to assess humanistic attitudes and behaviours relevant to patient care and has demonstrated acceptable reliability and validity among health professional students in Syria (17).

The full questionnaire consisted of 34 items divided into two sections. The first section contained seven items assessing demographic and background characteristics, including sex, field of study, university, academic year, speciality or professional status, employment status, and socioeconomic characteristics. The second section comprised the 27 MHS items.

Each MHS item was rated on a 7-point Likert scale ranging from 1 (“strongly disagree”) to 7 (“strongly agree”). Ten negatively worded items were reverse-scored before calculating the total score. Total MHS scores ranged from 27 to 189, with higher scores indicating a higher level of medical humanism (17).

Statistical Analysis

Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS), version 26 (IBM Corp., Armonk, NY, USA). Descriptive statistics were used to summarise demographic characteristics and MHS scores. Continuous variables were reported using means, standard deviations, medians, and ranges, as appropriate, while categorical variables were summarised using frequencies and percentages.

Demographic characteristics of the 2022 and 2026 samples were compared using chi-square tests or appropriate exact procedures for sparse categories. Total MHS scores were compared between the two independent samples using an independent-samples *t* test. Because equality of variances was not met, Welch’s *t* test was used for the primary unadjusted comparison. The Mann–Whitney *U* test was also performed as a nonparametric sensitivity analysis. Effect sizes were reported using Cohen’s *d* and rank-biserial correlation.

Because the two samples differed in several demographic characteristics, an adjusted comparison was performed using multiple linear regression with heteroscedasticity-consistent HC3 robust standard errors. The model adjusted for sex, specialization, employment status, financial situation, marital status, university type, and academic stage. A bootstrap sensitivity analysis with 5,000 replications was conducted to assess the stability of the adjusted estimate. Item-level differences across the 27 MHS items were assessed using Mann–Whitney *U* tests. To account for multiple comparisons, *P* values were adjusted using the Benjamini–Hochberg false discovery rate procedure. For the adjusted regression analysis, the pre-December 2024 sample was specified as the reference category so that the sampling-period coefficient represented the adjusted difference in the post-December 2024 sample relative to the pre-December 2024 sample.

Internal consistency of the MHS was evaluated using Cronbach's α and McDonald's ω . Split-half reliability was additionally assessed using Spearman–Brown and Guttman coefficients. Differences in Cronbach's α between samples were examined using Feldt's test. Sampling adequacy for factor analysis was assessed using the Kaiser–Meyer–Olkin measure and Bartlett's test of sphericity. Principal component analysis was used to examine the underlying component structure, and parallel analysis was used to guide component retention.

Subgroup associations with total MHS score were evaluated separately within the 2022 and 2026 samples. Depending on the number of categories and distributional assumptions, independent-samples tests, one-way ANOVA, Welch's ANOVA, and Kruskal–Wallis tests were used as appropriate. Two-way ANOVA models were used to examine whether selected demographic associations with MHS scores differed between the two sampling periods. A two-sided P value < 0.05 was considered statistically significant.

Results

Participant Characteristics and Sample Comparability

A total of 991 participants from medical and health sciences fields were included in the analysis, comprising 495 participants in the 2022 sample and 496 participants in the 2026 sample. All participants had complete data for the 27 Medical Humanity Scale (MHS) items and the demographic variables included in the analysis.

Sex distribution was nearly identical between the two samples, with females comprising 61.7% of the 2026 sample and 61.8% of the 2022 sample. Employment status and financial situation did not differ significantly between the samples. In contrast, statistically significant differences in sample composition were observed for specialisation, marital status, university type, and academic stage (Table 1).

The most pronounced between-sample difference was observed in university type. Participants from private universities represented 12.9% of the 2026 sample and 38.4% of the 2022 sample, whereas participants from public universities represented 78.4% and 52.5%, respectively. The 2022 sample also included a smaller proportion of students in the early academic years and larger proportions of general practitioners and postgraduate specialization trainees compared with the 2026 sample.

Total MHS Score Before and After December 2024

The mean total MHS score was significantly higher in the post-December 2024 sample than in the pre-December 2024 sample (157.52 [SD 12.04] vs 155.39 [SD 13.70], respectively). Welch's independent-samples t test showed a statistically significant difference between the two samples, $t(972.5)=2.61$, $P=0.009$, corresponding to a mean difference of 2.14 points (95% CI 0.53–3.74). The magnitude of the difference was small (Cohen's $d=0.17$). The Mann–Whitney U test yielded a consistent result ($U=133,395$,

$P=0.018$), supporting the robustness of the unadjusted comparison of total MHS scores, as shown in Table 2.

Adjusted Comparison Before and After December 2024

Because the pre- and post-December 2024 samples differed significantly in specialisation, marital status, university type, and academic stage, an adjusted analysis was performed using multiple linear regression with heteroscedasticity-consistent (HC3) robust standard errors. The model adjusted for sex, specialization, employment status, financial situation, marital status, university type, and academic stage.

After adjustment, participants in the post-December 2024 sample had a significantly higher total MHS score than those in the pre-December 2024 sample ($B=2.01$, $SE=0.86$, 95% CI 0.33–3.69, $P=0.019$). A bootstrap sensitivity analysis based on 5,000 replications produced a similar 95% confidence interval (0.38–3.67), supporting the stability of the adjusted estimate. The model explained 14.3% of the variance in total MHS score ($R^2=0.143$; adjusted $R^2=0.125$), as shown in Table 3.

Item-Level MHS Differences

Item-level differences across the 27 MHS items were examined using Mann–Whitney U tests with Benjamini–Hochberg false discovery rate (FDR) correction for multiple comparisons. Nine items remained statistically significant after FDR correction (Table 4).

Compared with the post-December 2024 sample, the pre-December 2024 sample had lower scores on items related to treating patients with kindness, respecting patients regardless of background, willingness to treat enemies or individuals with different opinions or beliefs, equality of care across public and private settings, and rejection of unethical experimentation. In contrast, the pre-December 2024 sample had higher scores on items related to reporting ethically disreputable colleagues and the reverse-scored item concerning decision-making on behalf of a helpless patient.

Reliability and Psychometric Performance of the MHS

The MHS demonstrated acceptable reliability in both samples, with modestly higher reliability estimates in the pre-December 2024 sample. Cronbach's α was 0.709 (95% CI 0.671–0.745) in the post-December 2024 sample and 0.758 (95% CI 0.726–0.787) in the pre-December 2024 sample. The difference in Cronbach's α was statistically significant (Feldt's test, $P=0.041$). McDonald's ω was 0.787 in the post-December 2024 sample and 0.813 in the pre-December 2024 sample, with correspondingly higher split-half reliability coefficients in the pre-December 2024 sample, as shown in Table 5.

Both samples demonstrated adequate sampling adequacy for factor analysis, with KMO values of 0.789 in the post-December 2024 sample and 0.832 in the pre-December 2024 sample. Bartlett's tests of sphericity were statistically significant in both samples (both $P<0.001$). Principal component analysis identified nine components with eigenvalues greater than 1 in each sample. However, parallel analysis

suggested retaining fewer components: four components in both samples using the mean-eigenvalue criterion, and four and three components in the post- and pre-December 2024 samples, respectively, using the 95th-percentile criterion.

Subgroup Associations with Total MHS Score

Subgroup analyses were conducted separately in the pre- and post-December 2024 samples. Female participants had significantly higher total MHS scores than male participants in both samples. Specialisation was also significantly associated with total MHS score in both samples, with participants in dentistry generally scoring lower than those in medicine and pharmacy. Participants from private universities had significantly higher total MHS scores than those from public universities in both samples, as shown in Table 6.

Employment status was not significantly associated with total MHS score in the post-December 2024 sample; however, in the pre-December 2024 sample, employed participants had significantly lower scores than unemployed participants. Financial situation and marital status were not significantly associated with total MHS score in either sample. The association with academic stage was not considered robust: although the standard ANOVA was statistically significant in the pre-December 2024 sample, the finding was not confirmed by Welch's ANOVA or the Kruskal–Wallis test (Table 7).

Period-by-Demographic Interaction Analyses

Two-way ANOVA models were used to assess whether differences in total MHS scores according to sex and university type varied between the pre- and post-December 2024 samples. Neither the sampling period $\times$ sex interaction ($F=0.60$, $P=0.439$) nor the sampling period $\times$ university type interaction ($F=0.13$, $P=0.718$) was statistically significant. These findings indicate that the associations between total MHS score and sex and between total MHS score and university type did not differ significantly between the two sampling periods, as shown in Table 8.

Discussion

This study compared medical humanity among Syrian medical and health sciences students, graduates, and healthcare professionals using two independent samples collected before and after December 2024. The principal finding was that participants in the post-December 2024 sample had a modestly higher total Medical Humanity Scale (MHS) score than those in the pre-December 2024 sample, and this difference was statistically significant. This difference remained significant after adjustment for demographic, educational, and professional characteristics. However, the magnitude of the overall difference was small, indicating that the observed variation between the two periods should be interpreted cautiously and should not be considered evidence of a broad or substantial change in medical humanism.

The item-level findings provide a more detailed understanding of this difference. Compared with the pre-December 2024 sample, participants in the post-December 2024 sample had higher scores on several items related to kindness, respect for patients regardless of background, willingness to treat individuals considered enemies or those holding different opinions or beliefs, equality of care across healthcare settings, and rejection of unethical experimentation. These findings are particularly relevant in the Syrian context, where more than a decade of revolution, armed conflict, displacement, social fragmentation, and healthcare-system disruption has exposed healthcare professionals and trainees to substantial psychological, ethical, and professional pressures (5, 6, 19–21).

The higher scores observed for willingness to provide care across ideological, personal, or social divisions may suggest a stronger endorsement of impartial and nondiscriminatory patient care within the post-December 2024 sample. Humanism in medicine is fundamentally grounded in respect, empathy, compassion, altruism, integrity, and equitable treatment regardless of a patient's identity or background (1–3). In settings affected by prolonged conflict, maintaining these principles may be particularly important because healthcare professionals may encounter patients from diverse political, social, geographic, or ideological backgrounds. Previous research among Syrian healthcare professionals during the crisis has similarly emphasized the importance of empathy and the need to address patients' physical, psychological, and social needs despite highly challenging circumstances (22, 23).

Higher post-December 2024 scores were also observed for items related to rejection of unethical experimentation and equality of care across public and private healthcare settings. Syria's healthcare system has experienced extensive disruption, including damage to healthcare infrastructure, workforce shortages, inequalities in healthcare access, limited resources, and fragmentation of service delivery (5, 6). Against this background, stronger endorsement of ethical protections and equitable treatment in the post-December sample may be noteworthy. Nevertheless, the present study did not directly assess participants' experiences within specific healthcare institutions or determine whether these attitudes were influenced by changes in healthcare governance, education, clinical exposure, or other contextual factors.

Not all dimensions of medical humanity followed the same direction. The post-December 2024 sample had lower scores on the item related to reporting ethically disreputable colleagues and on the reverse-scored item concerning decision-making on behalf of a helpless patient. The latter finding may reflect differences in attitudes toward patient autonomy, beneficence, family involvement, or clinical responsibility, but it should not be interpreted as a direct measure of patient autonomy alone. This bidirectional pattern is important because it indicates that the observed difference between periods should not be interpreted as a uniform improvement in medical humanism. Rather, different dimensions of humanistic and professional attitudes may have changed independently. Humanism is a multidimensional construct, and professional accountability, interpersonal care, patient autonomy, ethical conduct, compassion, and nondiscrimination may not necessarily develop in parallel (1–3).

The finding related to reporting ethically disreputable colleagues may reflect differences in perceptions of professional accountability, institutional trust, reporting culture, or the perceived consequences of raising concerns about colleagues. However, these possibilities remain speculative because the present study did not assess participants' views regarding institutional reporting systems, professional regulation, whistleblowing, or workplace safety. Similarly, interpretation of the item related to decision-making for a helpless patient should remain cautious because responses may reflect complex attitudes toward autonomy, beneficence, family involvement, and clinical responsibility rather than a single dimension of patient-centred care. Further qualitative research may help clarify the reasons underlying these item-specific differences.

Importantly, the observed differences should not be interpreted as evidence that the political and national events surrounding December 2024 caused changes in medical humanity. The study compared two independent cross-sectional samples collected during different periods rather than following the same participants longitudinally. Furthermore, the study did not directly measure participants' political experiences, attitudes toward national events, degree of exposure to conflict, displacement history, personal loss, trauma exposure, or migration experience. The observed differences may therefore reflect a combination of historical, social, educational, professional, institutional, and individual factors rather than a direct effect of any single national event.

The pre- and post-December 2024 samples also differed significantly in several demographic and educational characteristics. The corrected sample distribution showed a substantially greater proportion of private-university participants in the pre-December 2024 sample, whereas public-university participants represented a larger proportion of the post-December 2024 sample. The pre-December sample also contained larger proportions of general practitioners and postgraduate specialization trainees, whereas the post-December sample included a greater proportion of participants in earlier academic stages. These differences are important because educational and professional characteristics were themselves associated with MHS scores.

To reduce the influence of these differences, multiple linear regression was used to adjust for sex, field of study, employment status, financial situation, marital status, university type, and academic stage. The total MHS score remained significantly higher in the post-December 2024 sample after adjustment, and the bootstrap sensitivity analysis produced a similar confidence interval. This supports the stability of the observed association between sampling period and MHS score. Nevertheless, statistical adjustment cannot eliminate residual or unmeasured confounding, particularly because several potentially important characteristics were not assessed.

The MHS demonstrated acceptable internal consistency in both samples, although reliability estimates were somewhat higher in the pre-December 2024 sample. Cronbach's α , McDonald's ω , and split-half reliability coefficients were all modestly higher in the pre-period sample. These findings remain broadly consistent with the previously reported reliability and validity of the MHS among Syrian health professional students (17). Both samples also demonstrated adequate Kaiser–Meyer–Olkin values and

statistically significant Bartlett's tests of sphericity, supporting the suitability of the data for component analysis.

Principal component analysis identified nine components with eigenvalues greater than 1 in both samples, whereas parallel analysis suggested retaining fewer components. Using the mean-eigenvalue criterion, four components were retained in both samples, while the 95th-percentile criterion suggested three components in the pre-December 2024 sample and four components in the post-December 2024 sample. These findings suggest that the underlying structure of the MHS may be multidimensional and warrants continued psychometric investigation across different populations and periods rather than being assumed to represent a strictly unidimensional construct.

Several subgroup associations were observed across the two samples. Female participants had significantly higher total MHS scores than male participants in both periods. Field of study was also significantly associated with total MHS scores in both samples, with participants in dentistry generally scoring lower than those in medicine and pharmacy. Participants from private universities had higher MHS scores than those from public universities in both samples. Importantly, the sampling period $\times$ sex and sampling period $\times$ university type interactions were not statistically significant, indicating that these associations did not differ significantly between the two sampling periods.

Employment status demonstrated a period-specific association after correction of the sample labels. In the pre-December 2024 sample, employed participants had significantly lower MHS scores than unemployed participants, whereas no significant employment-related difference was observed in the post-December 2024 sample. This finding may reflect differences in clinical workload, professional responsibilities, occupational stress, or characteristics of participants entering employment. However, because working hours, practice setting, workload, burnout, and professional stress were not measured, this association should be interpreted cautiously.

Financial situation and marital status were not significantly associated with total MHS scores in either period. Academic stage showed a statistically significant association in the standard ANOVA within the pre-December 2024 sample; however, this finding was not confirmed by Welch's ANOVA or the Kruskal–Wallis test. The academic-stage association should therefore not be regarded as robust.

The present findings add to the literature examining professionalism, empathy, and medical education in healthcare systems affected by prolonged conflict. Previous research has documented extensive damage to Syria's healthcare infrastructure, displacement of healthcare professionals, shortages of resources, disruption of clinical services, and sustained pressure on professionals who continued to work within the country (5–7). Research examining the reconstruction of healthcare and medical education systems in fragile and post-conflict settings further suggests that recovery involves not only rebuilding infrastructure and workforce capacity but also strengthening education, institutional culture, professional development, and healthcare governance (11–16).

Within this context, the modestly higher overall MHS score observed in the post-December 2024 sample may represent an encouraging finding, particularly because several of the higher-scoring items concerned non-discrimination, impartial care, ethical treatment, and respect for patients across differences in background or beliefs. However, the small effect size, differences in sample composition, and bidirectional item-level findings indicate that the results should not be interpreted as evidence of a generalised improvement in humanistic values. Rather, they suggest that particular aspects of medical humanity may differ across periods of substantial national, educational, and healthcare-system change.

Future research should examine these patterns using longitudinal designs that follow the same individuals over time. Such studies would be better able to distinguish true within-person change from differences in sample composition. Future research should also incorporate measures of conflict exposure, displacement and migration history, trauma, psychological well-being, burnout, professional workload, geographic location, institutional environment, and clinical working conditions. Qualitative studies may be especially useful for understanding how Syrian healthcare professionals and trainees conceptualise impartiality, professional accountability, patient autonomy, ethical responsibility, and humanistic practice within a rapidly changing healthcare and educational environment.

Repeated assessment of the MHS across different universities, healthcare institutions, professional groups, and geographic regions may also help determine whether the current patterns persist, diminish, or evolve over time. Such evidence could inform professionalism and medical ethics education and support broader efforts to strengthen patient-centred, equitable, and ethically grounded healthcare as Syria's medical education and healthcare systems continue to develop.

Limitations

Several limitations should be considered when interpreting these findings. First, this was a comparative cross-sectional study involving two independent samples rather than a longitudinal study following the same individuals over time. Consequently, within-person changes in medical humanity could not be assessed, and the observed differences between the pre- and post-December 2024 samples may partly reflect differences in cohort composition rather than true temporal change.

Second, participants were recruited using convenience sampling through social media groups and online platforms. This approach may have introduced selection bias and may limit the generalizability of the findings to all medical and health sciences students, graduates, and healthcare professionals in Syria, particularly individuals with limited internet access or lower engagement with online platforms.

Third, the MHS is a self-reported measure and may therefore be influenced by social desirability, recall, and other response biases. The extent of these biases may also have differed between the two sampling periods.

Fourth, although the adjusted analysis accounted for several measured demographic, educational, and professional characteristics, potentially important confounders were not assessed. These include direct

exposure to violence, displacement and migration history, personal losses, trauma exposure, psychological well-being, burnout, geographic location, workload, healthcare setting, and individual experiences related to the events surrounding December 2024. Prolonged conflict and displacement have had substantial consequences for Syria's healthcare workforce and healthcare system (5, 7, 8).

Fifth, the two samples were collected approximately four years apart. Therefore, the observed differences may reflect not only changes in the broader national context but also differences in medical education, professional experience, healthcare-system conditions, institutional culture, or other unmeasured temporal factors occurring between 2022 and 2026.

Sixth, although the overall difference in total MHS score remained statistically significant after adjustment, the effect size was small. Statistical significance should therefore not be interpreted as evidence of a large or necessarily clinically or educationally important difference between the two periods.

Finally, several item-level differences were observed in opposing directions. Although the post-December 2024 sample had higher scores on several dimensions of medical humanity, lower scores were observed on other items. Accordingly, the findings should not be interpreted as evidence of a uniform improvement in medical humanism. Rather, they suggest that different dimensions of humanistic and professional attitudes may vary independently across periods of substantial national, educational, and healthcare-system change.

Conclusion

Medical humanity differed modestly but significantly between independent samples of Syrian medical and health sciences students, graduates, and healthcare professionals collected before and after December 2024. Total MHS scores were higher in the post-December 2024 sample than in the pre-December 2024 sample, and this difference remained statistically significant after adjustment for measured demographic, educational, and professional characteristics. However, the small effect size indicates that the overall difference between the two periods was limited in magnitude.

Item-level findings showed a multidirectional pattern rather than a uniform improvement across all aspects of medical humanity. The post-December 2024 sample demonstrated higher scores on several items related to kindness, respect for patients regardless of background, willingness to provide care across ideological or personal differences, equality of care, and rejection of unethical experimentation. In contrast, lower post-December scores were observed on items related to reporting ethically disreputable colleagues and one aspect of patient decision-making.

These findings suggest that different dimensions of medical humanity may vary independently across periods of substantial national, educational, and healthcare-system change. Because the study compared two independent cross-sectional samples, the observed differences should not be interpreted as evidence that the events surrounding December 2024 directly caused changes in humanistic values.

Further longitudinal and qualitative research is needed to clarify the factors underlying these patterns and to inform professionalism, medical ethics, and patient-centred care education as Syria's healthcare and medical education systems continue to develop.

Abbreviations

MHS

Medical Humanity Scale

Declarations

Ethical approval and consent to participate

Ethical approval for this study was obtained from the Ethical Committee of Aleppo University, Syria, with serial number (56754). Informed consent was obtained from participants as part of the electronic form. The study complied with the principles of the Helsinki Declaration.

Competing interests

There are no financial or non-financial competing interests.

Availability of data and materials

The data generated or analysed during this study are not publicly available because they are in Arabic. However, anyone who requires access to the dataset can reach out to the corresponding author directly.

Author Contributions

M Malek participated in writing the manuscript, reviewing the relevant literature, and collecting the data. Jamal A statistically analysed the data and created the tables. Jawdat A critically and linguistically revised the manuscript. Jawdat A contributed to the revision and preparation of the manuscript. Jawdat A conceived and supervised the conduct of the study. All authors have read and approved the final manuscript.

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Tables

Tables 1 to 8 are available in the supplementary files section

Supplementary Files

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