ORIGINAL ARTICLE

Perceived Benefits of Science and Technology and Self-Rated Health in Türkiye: Evidence from the World Values Survey

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ABSTRACT

BACKGROUND: ***This study aimed to examine the association between individuals' perceptions that science and technology make life healthier, easier, and more comfortable and their current self-rated health status.***

METHODS: ***This cross-sectional study used publicly available data from the 2018 wave of the World Values Survey. The source sample comprised 2,415 respondents from Türkiye. The simple linear regression included 2,386 respondents with valid data on both primary variables. Self-rated health status was examined as the dependent variable, and the perceived benefits of science and technology were assessed as the main independent variable. Descriptive statistics, Mann-Whitney U tests, Kruskal-Wallis H tests with Dunn-Bonferroni post hoc comparisons, and simple linear regression analysis were performed using JASP version 0.17.1. Statistical significance was set at $p < .05$.***

RESULTS: ***Perceived benefits of science and technology were significantly associated with self-rated health status ($B = -0.047$, $t = -7.293$, $p < 0.001$). The explanatory power of the regression model was modest ($R^2 = 0.022$). Self-rated health also differed significantly according to age, marital status, educational level, employment status, occupational status, and income level ($p < .001$ for all comparisons).***

CONCLUSIONS: ***The findings suggest that more favorable perceptions of science and technology are weakly but significantly associated with better self-rated health. Socio-demographic and socioeconomic characteristics are also important correlates of health perception. Public health strategies should strengthen health literacy and promote equitable access to beneficial technologies, particularly among disadvantaged groups.***

KEYWORDS: ***Science; Technology; Self-Rated Health; Health Status; World Values Survey; Türkiye***

INTRODUCTION

Scientific and technological advancements continually reshape both public and individual perceptions. These perceptions are influenced by various factors, including the media and public opinion, which play significant roles in how science and technology are viewed (1). Science provides technology with new knowledge, tools, and methods, while technology generates new questions, applications,

and techniques that advance scientific development (2). The relationship between science, technology, and health can therefore be examined not only through objective innovations but also through individuals' subjective evaluations of these developments (3).

Digital technologies are increasingly being used to reduce health disparities, improve well-being, and expand access to health-related information and services. As technological tools become more prominent in health promotion, disease monitoring, physical activity, and health information seeking, individuals' health-related behaviors and expectations may also evolve (4). Artificial intelligence (AI) has emerged as one of the most prominent technological developments in healthcare, with potential applications in diagnosis, treatment planning, monitoring, and clinical decision support. For example, studies indicate that healthcare payment reforms in the US are being implemented to encourage data sharing and address existing data-sharing challenges (5). Daniel et al. reported that although healthcare professionals had positive perceptions and expectations regarding the role of AI in medical care, their in-depth knowledge and practical experience with AI applications remained limited (6). Another key area is wearable technology in healthcare, where wearable devices enable patients to monitor their health data at home, offering significant opportunities for early diagnosis, treatment, and disease management (7). Technology, particularly in time-sensitive healthcare settings, helps minimize or eliminate health risks caused by human error (8). Studies have also shown that digital technologies can reduce human error in time-sensitive clinical environments and improve processes such as screening, clinical consultation, documentation, and telepsychiatry (9).

Digital health interventions have shown considerable potential in supporting healthy aging among older adults (10). The continued development of digital technologies may substantially enhance the quality of life of older adults, highlighting the need for government-industry collaboration and innovative policies to support this progress (11). Studies have also demonstrated that digital health literacy interventions positively affect the health status of older adults (12). A qualitative study conducted in Swedish nursing homes found that IoT sensor systems improved users' perceptions of security, control, and independence among older adults, people with disabilities, staff, and relatives. However, the study also highlighted the need for innovative solutions, including participatory user-centered design, stable system operation, privacy protection, and the integration of camera-based and machine-learning functions to maximize system effectiveness (13).

This study aimed to examine whether the perception that science and technology make life healthier, easier, and more comfortable is associated with individuals' current self-rated health status.

The original contribution of this study lies in its use of a large Türkiye sample from World Values Survey Wave 7 to evaluate the association between perceived benefits of science and technology and self-rated health in Türkiye. Unlike studies focusing on specific occupational, clinical, or educational groups, this study provides a broader population-level assessment across age, education, employment, occupation, marital status, and income groups. Although previous studies in Türkiye have examined health literacy, health perception, online health information seeking, and technology acceptance in specific populations (14-17), relatively little evidence has explored whether the general public's perception that science and technology make life healthier, easier, and more comfortable is associated with self-rated health in an unweighted analysis of the WVS Türkiye sample. The research questions were:

1. Is the perception that science and technology make life healthier, easier, and more comfortable associated with self-rated health in Türkiye?
2. Do self-rated health perceptions differ according to socio-demographic characteristics?

METHODS

Study Design and Data Source: This study used a cross-sectional quantitative research design based

on secondary data from the seventh wave of the World Values Survey conducted in Türkiye in 2018. The analyses used a Türkiye-specific analytical extract of WVS Wave 7 (2,415 rows; 18 selected variables). The World Values Survey is an international research program that collects nationally representative data on values, beliefs, attitudes, and perceptions across social, economic, political, and health-related domains.

The study examined whether respondents who perceived science and technology as making life healthier, easier, and more comfortable reported different levels of self-rated health status. Because the dataset is publicly available and anonymized, the present study did not involve direct contact with participants.

Participants and Sampling: The analytical dataset comprised 2,415 respondents from the 2018 Türkiye sample of World Values Survey Wave 7. Valid observations were available for self-rated health (n = 2,406) and perceived benefits of science and technology (n = 2,394). The simple linear regression used 2,386 complete observations on both variables. Missing or non-substantive responses were excluded on an analysis-specific basis.

Measures: Self-rated health status was the dependent variable. It was measured using the WVS item asking respondents to evaluate their general state of health at the time of the survey. Responses were recorded on an ordinal scale ranging from very good health to very poor health. Lower scores indicated more favorable self-rated health.

The primary independent variable was the perception that science and technology make life healthier, easier, and more comfortable. Respondents rated their agreement with this statement on a ten-point scale, where higher scores indicated a more favorable perception of science and technology.

Several socio-demographic variables were included to describe the study population and compare self-rated health across groups. These variables included gender, age, marital status, educational level, employment status, occupational status, income level, number of children, living arrangements, and employment sector. For group comparisons, the self-reported ten-point income ladder was recoded into low (1–3), middle (4–7), and high (8–10) categories. These groups represent subjective positions on the income scale rather than monetary income thresholds.

Statistical Analysis: All analyses were conducted using JASP version 0.17.1. Descriptive statistics were used to summarize the sample characteristics and the main study variables. Frequencies, percentages, means, standard deviations, minimum values, and maximum values were calculated where appropriate.

Shapiro–Wilk tests showed non-normal distributions for self-rated health ($W = 0.825$) and perceived benefits of science and technology ($W = 0.914$; both $p < 0.001$). Given the ordinal outcome, rank-based tests were used for group comparisons. The Mann-Whitney U test was used for two-group comparisons, and the Kruskal-Wallis H test was used for comparisons involving more than two groups. Dunn-Bonferroni post-hoc tests were conducted when Kruskal-Wallis analyses produced statistically significant results.

Simple linear regression analysis was used to examine the association between perceived benefits of science and technology and self-rated health status. Regression coefficients, t values, p values, model fit statistics, and explained variance (R^2) were reported. All statistical tests were two-tailed, and p values below 0.05 were considered statistically significant. All analyses were unweighted because the available 18-variable analytical extract did not contain the original WVS sampling weights or survey-design variables. Consequently, the estimates describe associations in the analyzed sample rather than survey-weighted national population effects.

Ethical Considerations: This study used publicly available secondary data obtained from the World Values Survey database. The dataset contains anonymized responses and does not include personally identifiable information. Therefore, additional ethical approval was not required for this secondary analysis. The original WVS data collection procedures were conducted in accordance with ethical standards, and participants provided informed consent during the original survey process.

RESULTS

Socio-demographic characteristics: The study sample was nearly evenly distributed by gender, with 49.98% male and 50.02% female respondents. The largest age group was 25–34 years (24.18%), followed by 35–44 years (22.94%). Respondents aged 65 years and older were underrepresented, accounting for approximately 1.24% of the sample. Most respondents were married (61.99%) or single (32.42%), whereas divorced and widowed respondents represented relatively small proportions of the sample.

Regarding educational attainment, the largest group consisted of primary school graduates (35.00%), followed by high school graduates (24.20%) and university graduates (15.80%). A notable proportion of respondents had never attended school (6.90%). In terms of occupation, skilled workers constituted the largest group (31.34%), followed by respondents who had never held a job (28.26% of valid occupational responses). Regarding family status, 40.33% of respondents had no children, whereas 24.35% had two children.

Most respondents did not live with their parents or parents-in-law (70.56%), whereas 28.41% reported living with their parents. Full-time paid employees accounted for 42.11% of the sample, homemakers for 25.34%, self-employed individuals for 9.69%, and job seekers for 6.67%. Among respondents with a valid answer to the current or most recent employment-sector item (n = 1,819), 83.01% reported the private sector, 16.16% the public sector, and 0.82% the private non-profit sector.

The mean self-rated health score was 2.159 (SD = 0.734), indicating that respondents generally perceived their health positively. The mean score for the perception that science and technology make life healthier, easier, and more comfortable was 7.334 (SD = 2.288), reflecting generally favorable perceptions of science and technology, although responses varied considerably across the sample (Table 1).

Table 1: Descriptive statistics of the main study variables.

Variables	Valid n	Shapiro–Wilk p-value	Min	Max	Mean±SD
Perception of the state of health in general these days	2,406	< .001	1.00	5.00	2.159±0.734
Perception of science and technology to make lives healthier, easier and more comfortable	2,394	< .001	1.00	10.00	7.334±2.288

Note: SD = standard deviation. Lower self-rated health scores indicate more favorable perceived health status.

Group comparisons: Regarding age, younger participants (16–24 and 25–34 years) reported significantly more favorable health perceptions than older age groups, particularly those aged 55–64 years. Single respondents reported more favorable self-rated health than married respondents (mean scores: 2.050 vs. 2.195; Dunn–Bonferroni adjusted $p < 0.001$). Differences between married and divorced respondents (adjusted $p = 0.846$), and between married and widowed respondents (adjusted $p = 0.256$), were not statistically significant. Educational attainment was positively associated with health perception, with university graduates reporting significantly more favorable evaluations of their health than individuals with lower educational levels.

Employment status also showed significant differences. Students consistently reported the most favorable health perceptions, whereas retirees, homemakers, and job seekers tended to report less favorable health perceptions. Similarly, individuals employed in professional and technical occupations reported better health perceptions than service workers, skilled and unskilled workers, and farm owners or managers.

Finally, income level demonstrated a clear gradient. Participants in the high-income group reported significantly better health perceptions than those in the middle-income group, while middle-income participants reported better health perceptions than those in the low-income group. Overall, the findings suggest that socioeconomic

advantages, including higher educational attainment, professional employment, and higher income, are associated with more positive perceptions of health status (Table 2).

Table 2: Differences in self-rated health status across socio-demographic characteristics.

Variable	χ^2	p-value	All significant pairwise comparisons (Dunn–Bonferroni, adjusted p)
Age	79.718	<.001	16–24 vs 35–44 (p = .0236), 45–54 (p < .001), 55–64 (p < .001), 65+ (p < .001); 25–34 vs 45–54 (p < .001), 55–64 (p < .001), 65+ (p = .0036); 35–44 vs 55–64 (p < .001), 65+ (p = .0434).
Marital Status	42.638	<.001	Married vs Single (p < .001); Divorced vs Single (p = .0049); Widowed vs Single (p < .001).
Education	58.479	<.001	Never attended school vs Middle school graduate (p = .0147), High school graduate (p = .0127), University graduate (p < .001); Left primary school vs University graduate (p = .0149); Primary school graduate vs Middle school graduate (p = .0438), High school graduate (p = .0102), University graduate (p < .001).
Employment	52.843	<.001	Full-time paid vs Retired (p = .0072), Homemaker (p = .0107), Student (p < .001); Part-time paid vs Student (p = .0029); Self-employed vs Student (p = .0047); Retired vs Student (p < .001), Job seeker (p = .0353); Homemaker vs Student (p < .001); Student vs Job seeker (p = .0482).
Occupation	34.434	<.001	Professional/Technical vs Never had a job (p = .0036), Service worker (p = .0116), Skilled worker (p = .0292), Unskilled worker (p = .0059), Farm owner/manager (p = .0026).
Income	56.314	<.001	Low vs Medium (p < .001), High (p < .001); Medium vs High (p < .001).

Note: All statistically significant Dunn–Bonferroni pairwise comparisons are reported (Bonferroni-adjusted, two-sided p < .05); non-significant pairs are omitted. Kruskal–Wallis H statistics are shown in the χ^2 column. Degrees of freedom: age = 5; marital status = 5; education = 10; employment = 7; occupation = 9; income = 2. Analyses are unweighted and use available valid cases for each comparison. Lower self-rated health scores indicate better perceived health.

Simple regression analysis: Simple linear regression analysis showed that a more favorable perception of science and technology was significantly associated with self-rated health status (B = -0.047, t = -7.293, p < 0.001). The analysis included 2,386 complete cases (95% CI for B: −0.0602 to −0.0347; F(1, 2384) = 53.185; R^2 = 0.022). Because lower scores indicate better perceived health, the negative regression coefficient suggests that respondents with more favorable perceptions of science and technology tended to report slightly better self-rated health. However, the explanatory power of the model was modest (R^2 = 0.022), indicating that perceived benefits of science and technology accounted for only a small proportion of the variance in self-rated health status (Table 3).

Table 3: Simple linear regression predicting self-rated health status.

Dependent variable	Independent variable	B	t	p	R^2	F
Perception of the state of health in general these days	Constant	2.506	50.118	<0.001	0.022	53.185
	Perception of science and technology to make lives healthier, easier and more comfortable	-.047	-7.293	<0.001		

Note: N = 2,386 (complete cases); 95% CI for the slope = −0.0602 to −0.0347. Lower self-rated health scores indicate more favorable perceived health status.

DISCUSSION

This study examined the association between perceived benefits of science and technology and self-rated health status in Türkiye using data from the 2018 World Values Survey. The findings showed that respondents with more favorable perceptions of science and technology tended to report slightly better self-rated health. However, the association was weak, indicating that health perception is influenced by a broader range of social, demographic, and economic factors.

Age was significantly associated with self-rated health status. Younger respondents reported more favorable health perceptions than older respondents, particularly those aged 55–64 years. This pattern is consistent with the broader literature showing that age-related changes in health, functional status, and social circumstances may influence subjective health evaluations. Although Rickert et al. found that age was not a significant determinant of general health status among female adolescents (18), studies examining technology-related behaviors among young people have shown that internet use and digital habits may be associated with health-related outcomes, such as sleep disturbances (19).

Marital status was also significantly associated with self-rated health. Previous studies have shown that marriage may influence health through greater social support, economic stability, reduced stress exposure, and improved access to healthcare. House et al. examined the relationship between marriage, social support, and health and found that marriage was associated with better overall health outcomes (20). Waite and Gallagher also emphasized that marriage may have important positive effects on individuals' overall well-being and health (21). Hughes and Waite found that individuals who remained continuously married were less likely to experience long-term health problems than those who experienced marital dissolution through divorce or widowhood (22). They further reported that although remarriage may provide partial recovery, the health advantage observed among continuously married individuals is largely explained by socioeconomic factors and the cumulative effects of stress. In contrast to a simple interpretation of a marital health advantage, single respondents in this sample reported more favorable self-rated health than married respondents. The post-hoc comparisons did not establish statistically significant differences between married and divorced or widowed respondents; these unadjusted patterns may also reflect differences in age and other sociodemographic characteristics.

Educational attainment was another important factor associated with self-rated health. Kalichman et al. reported that patients with lower health literacy had poorer health-related knowledge and less favorable clinical outcomes than those with higher health literacy (23). Korkut et al. found that perceptions of lifestyle innovations in individuals with type 2 diabetes mellitus were associated with patients' awareness of and adherence to lifestyle-related recommendations, highlighting the importance of knowledge and behavioral orientation in health management (24). Similarly, the present study found that higher educational attainment was associated with more favorable self-rated health.

Employment status was significantly associated with self-rated health, consistent with previous studies demonstrating a close relationship between employment and health outcomes. Delattre et al. conducted a study in France and identified a bidirectional relationship between employment status and health, indicating that employment may influence health while health status may also affect employment (25). Jennings et al. reported that employed women generally had better health than homemakers or unemployed women, although this association may be partly explained by educational attainment and the healthy worker effect (26). A study conducted in Scandinavian countries also found a strong association between employment status and health, showing that unemployed individuals had poorer health than employed individuals. Although marital and parental status partially explained this relationship among women, no such effect was observed among men (27). A study of patients receiving hemodialysis in Denmark found that their self-assessed health status was significantly poorer than that of the general population, and that most of

these patients were unemployed (28). Moscone et al. reported that precarious employment may adversely affect mental health during periods of economic recession and disrupt stable employment trajectories (29). In the present study, students and employed respondents generally reported more favorable self-rated health than retirees, homemakers, and job seekers. These findings suggest that labor market position and social roles may contribute to differences in subjective health evaluation.

Occupational status was also associated with self-rated health, supporting previous evidence that working conditions and occupational categories influence health-related outcomes. Fishman reported that although occupational prestige may not directly determine general health outcomes, occupational categories are associated with differences in health behaviors and health risks, with particularly elevated risks observed in the construction and transportation sectors (30). A study conducted in China found that inequalities in working conditions—including overtime, environmental and occupational hazards, job demands, job control, and perceived rewards—explained approximately half of the effect of occupational status on individual health (31). Consistent with these findings, respondents employed in professional and technical occupations reported more favorable self-rated health than farm owners, farm managers, and several other occupational groups.

Income level demonstrated a clear gradient in self-rated health. This finding is consistent with previous evidence showing that socioeconomic disparities are strongly associated with health outcomes and health perceptions (32). Van Laar et al. showed that socioeconomic resources are associated with digital skills and technology-related competencies, suggesting that income may also influence individuals' ability to benefit from technological developments (33). Other studies have shown that sleep health is strongly influenced by socioeconomic factors, with sleep disorders being more common among low-income and socially disadvantaged populations (34, 35). Similarly, the present study found that higher income levels were associated with more favorable self-rated health.

Evidence from student populations has also demonstrated a weak but significant association between problematic smartphone use and symptoms of depression and anxiety (36). Similarly, the present study found that greater perceived benefits of science and technology were associated with lower self-rated health scores, indicating more favorable perceived health because lower scores represent better health status.

Overall, the findings indicate that self-rated health is shaped not only by perceptions of science and technology but also by broader demographic and socioeconomic conditions. These findings may inform public health policies aimed at improving health literacy, reducing socioeconomic inequalities, and promoting informed and equitable engagement with science- and technology-related health resources. Such efforts are particularly important because health literacy—a key determinant of health-promoting behaviors and health-related decision-making—is itself influenced by socio-demographic characteristics, including age, gender, and educational attainment (37).

This study has several limitations. First, its cross-sectional design precludes causal inference. Therefore, the findings demonstrate associations rather than causal relationships. Second, both self-rated health and perceptions of science and technology were measured using self-reported items, which may be subject to reporting bias and differences in individual interpretation. Third, respondents aged 65 years and older were underrepresented in the sample, limiting the generalizability of the findings to this population. Finally, because the data were collected in 2018, public perceptions of health and technology may have changed substantially following the COVID-19 pandemic. In addition, the analyses were conducted using an 18-variable extract without survey weights or design variables; therefore, estimates were unweighted and should not be interpreted as population-representative weighted effects. The simple linear regression was unadjusted for potential confounders, and the ordinal nature of the self-rated health outcome warrants further sensitivity analyses using ordinal models.

This study found a statistically significant, albeit weak, association between perceived benefits of science and technology and self-rated health status in Türkiye. More favorable perceptions of science and technology were associated with slightly better self-rated health, although the explanatory power of this association was limited. In addition, self-rated health differed significantly according to age, marital status, educational attainment, employment status, occupational status, and income level.

In conclusion, these findings suggest that health policies should not focus solely on expanding access to technology but should also address the social inequalities that shape health perceptions. Public health strategies that strengthen health literacy, reduce socioeconomic inequalities, and promote informed engagement with beneficial technologies may contribute to improved population health outcomes. These recommendations are policy considerations informed by observed associations, rather than demonstrated effects of the interventions themselves.

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