

Research Article

The Role of Social Health and Demographic Factors in Bread Quality: An Ecological Study in Isfahan, Iran

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Social health has been defined as participation in and responsibility for social processes. Because bread is considered an essential staple food in Iran, several social policies have been implemented to improve the quality of bread, regardless of social aspects. The current study aims to investigate the relationship between bread quality, bakers' social health, and demographic factors. This was a cross-sectional ecological study conducted in Isfahan, Iran. Stratified sampling was used to select 171 traditional bakeries from Isfahan's 15 municipality districts. The Adult Social Health Questionnaire was used to collect data. A laboratory test was employed to obtain data on bread quality. The Spearman correlation test, bivariate logistic regression, and multiple logistic regression were applied to analyze the data. The results showed that 36.26% of bakeries had pH ≤ 6 (high-quality bread) and 63.74% of them had pH > 6 (bread quality was low). The use of baking soda had a negative relationship with bakers' social health (P value = 0.029). According to the findings, low social health increased the likelihood of producing low-quality bread by 53% when compared to high social health. Education, specifically illiteracy and semiliteracy, increased the risk of low-quality bread production by 35% and 27%, respectively. Through responsibility, consciousness, and empathy, social health is linked to bread quality. This implies that health policies could be tailored to address the social health of bakeries in order to improve bread quality.

1. Introduction

The significance of social variables in health has received a lot of attention [1–3]. Among social aspects, social health is understudied in the field of occupational health. According to the World Health Organization, social health is a component of individual health [4]. Social health has been proposed as an individual involvement in social processes and participation in society [5]. It has two personal and social aspects, which are connected to people's social performance and their interaction with society [6].

Social health is a vital element in accepting social norms, allowing a person to maintain a healthy equilibrium and avoid unwanted social responses. People with social health can perform better in society [7] and expect to engage more in society

[8], as civilians in general and as workers in different occupations in particular. Social health is described as an individual's appraisal of the nature of their relationships with others, neighbors, and the community, and it involves a variety of elements that demonstrate how well people fulfill their roles and obligations in social life. People daily interact with various parts of their society such as family, educational environment, occupational place, neighbors, and neighborhood. In fact, they form their activities inside the social system. Thus, social health refers to how a person communicates with others and reflects on an individuals' capacity to function in society and maintain interpersonal interactions, the quality of established social networks, and social support [9].

Individuals involved in the bread supply chain must be in good physical, mental, and social health, since the primary

function of bakeries is to provide health-related products. The degree of the bakery's social health components can have an impact on this result. To be more precise, bakeries' goals align with the agreed-upon social business concept [10], as it emphasizes the role of several social health components in the bread baking process, such as social interaction, social participation, and social responsibility. This means that good social health will increase bread quality. Several studies have shown that collaboration, such as social relationships and interaction, is an important primary success factor in the food supply chain [11–13]. Collaboration is also crucial in the bread supply chain [14].

A healthy diet has been described as one of the main components of social determinants of health [15], and some professions, such as bakers, are more likely to provide healthy nutritional products. Healthy dietary policies including bread quality are so important that governments are seeking to address them by developing specific strategies.

Wheat and its products are among the most important of the food basket supplies in Iran. 84% of Iran's overall wheat is used to prepare wheat bread [16]. Bread is an important staple food for the Iranian population, providing 43 percent of the calories in urban households and 56 percent of the calories in rural households [17]. In addition to the proper production of wheat, the production of bread free of baking soda can be an important factor in the quality of bread, as soda can inhibit nutrient absorption in the body. Production of bread free of baking soda is clearly emphasized in the Iranian National Standard article 2628 [18]. Nevertheless, studies in several Iranian provinces have shown that 65% of bakeries in Qazvin [19], 67% in Zabol [20], and 14% of bakeries in Bandarabbas [21] use baking soda in bread.

In Iran, the Targeted Subsidies Law (TSL) was enacted in 2010. One of the TSL's goals was to improve bread quality. The TSL as a social policy appears to have overlooked the social aspects of bread quality, such as social health. Given the importance of physical and mental dimensions of bakers' health on bread quality, it seems that the social dimension of bakers' health like social health could have an effective role in explaining the quality of bread [22]. People who eat low-quality bread should not consume a nutritious diet. Since bread is a staple food in the food baskets of low-income people [23], they are vulnerable to a variety of diseases and nutritional shortages caused by the use of unfavorable substances in the bread-making method (such as baking soda, Blankit, and extra salt). Bakeries in Iran strive to produce higher-quality bread while adhering to professional ethics and using the same raw materials, cooking process, and level of training as their peers, perhaps irrespective of economic gain. Keeping in mind that bread is an essential food in the Iranian diet, the government has addressed bread quality through a variety of economic policies such as earmark subsidies. However, the role of social aspects of baker health is a field that has received little attention. In this study, the hypothesis is developed that factors other than the economic and technical factors in the bakery could affect the quality of bread. As a result, the aim of this study was to investigate the relationship between bread quality and bakers' social health.

2. Materials and Methods

This cross-sectional ecological study was carried out in Isfahan, Iran, in 2018. Data were gathered from bakeries in Isfahan. A proportionate stratified random sampling was used to select the bakeries. Isfahan city was first divided into five geographic strata, and bakeries were chosen based on the proportion of active bakeries in each stratum. Finally, 171 bakeries were sampled (44, 28, 45, 40, and 14 bakeries in the north, south, center, east, and west regions, respectively).

A researcher-completed social health questionnaire was used to collect data for social health as an explanatory variable. Rafiey et al. [6] previously verified the validity and reliability of the social health questionnaire. Using Cronbach's alpha coefficient, the internal consistency was 0.86. The content validity index of the questionnaire was greater than 80 percent. This questionnaire includes 29 questions divided into seven subscales including social interaction, social responsibility, and conscientiousness, attitude towards society, empathy, family relations, and social participation. More illustrations about social health subscales are given below. Social interaction conveys information about how we behave and respond to those around us. Social responsibility is a context within which every person is expected to act ethically and sensitively toward social, cultural, economic, and environmental issues for the benefit of society. Conscientiousness refers to the personality trait of being thorough, careful, or vigilant towards society. Attitude towards society is about predisposition or tendency to respond positively or negatively towards a community or society. Empathy means feeling that one person could understand and share another person's experiences and emotions. Family relations refer to the quantity and quality of family relationships with each other. Social participation refers to one's degree of participation in a community or society.

In Iran, on average, three main bakery employees work at each bakery and all of them are engaged in bread producing process. So, the total performance of these three workers indicated the quality of the final product (namely, sold bread). Moreover, as this study follows ecological design, the unit of analysis was group (bakery) rather than individual (bakery workers). Thus, the average social health score of three workers in each bakery was considered to be the social health score of the bakery (as an ecological level). In addition, according to the other studies in terms of food quality [24, 25] and specifically bread quality [26], years of schooling, length of working experience, ownership status, age, and district were investigated as other explanatory variables. Workers' average years of schooling, age, and duration of work experience have been estimated for use in ecological analysis. The social health scores were divided into three equal groups, viz., low (scores = 30–68), middle (scores = 69–89), and high (scores = 90–135). Moreover, restriction method was applied [27] to control potential confounding variables including baking time, type of bakery, and type of flour. The sample was therefore restricted to morning baking (6–8 AM), traditional bakery, and government flour.

The laboratory testing of pH bread was used to measure bread quality as an outcome binary variable. The use or nonuse of "baking soda" instead of yeast in the bread

TABLE 1: Social health and demographic variables of bakeries and percentage of bakeries producing low-quality bread.

Variable	Number of bakeries (%)	Amount of low-quality bread (%)
<i>Social health</i>	High	57 (33.33)
	Medium	57 (33.33)
	Low	57 (33.33)
<i>Years of schooling</i>	6 and lower	(26.32) 45
	7–12	(67.2) 115
	12 and higher	(6.43) 11
<i>Length of working experience</i>	10 and lower	(21.64) 37
	11–20	(40.35) 69
	Higher than 20	(38.01) 65
<i>Age</i>	≤30	(15.20) 26
	31–45	(54.39) 93
	>45	(30.41) 52
<i>Ownership situation</i>	Rental	(46.78) 80
	Owner	(53.22) 91
<i>District</i>	North	(25.73) 44
	South	28 (16.73)
	East	40 (23.39)
	West	14 (8.19)
	Center	45 (26.32)

production process is the benchmark assessment for bread quality. Because of its quantification and popularity, this criterion is used. The detection of baking soda in bread is based on the bread's pH being greater than 6 [20]. Previous research has shown a significant relationship between pH bread and baking soda and confirms the use of pH level as a criterion for bread quality [18].

The bread was bought (by an ordinary customer), packaged in plastic wrap, refrigerated, and then delivered to the laboratory for pH testing. According to Iranian National Standard no. 2628 [28], $\text{pH} \leq 6$ denotes high-quality bread, while $\text{pH} > 6$ denotes low-quality bread.

STATA/SE was used to analyze the data (version 14). We used Spearman correlation and bivariate and multiple logistic regressions. P values less than 0.05 were deemed significant. Variables with P values less than 0.1 in the bivariate logistic regression model were retained for inclusion in the corresponding multiple logistic model.

2.1. Ethical Considerations. The research ethics committee of Isfahan University of Medical Sciences approved this study, with the ethics code IR.MUI.REC.1396.3.321. In this study, all questionnaires were identified by coding; bread samples were provided to the laboratory only anonymously due to the legal implications that the use of baking soda could have for bakeries; and researchers agreed not to reveal information to any baker or individual. Furthermore, bakery employees were free to complete the questionnaire.

3. Results

The pH test results revealed that the bread pH ranged between 5.27 and 7.40 (mean = 6.14, SD = 0.36). 36.26% of bread had $\text{pH} \leq 6$ (high-quality bread), and 63.74% of them had $\text{pH} > 6$ (low bread quality). Table 1 displays descriptive statistics about social health, demographic variables, and

TABLE 2: The relationship between pH with social health and its components.

Variable	Correlation coefficient	P value
Social health	−0.47	0.02
Social interaction	−0.39	0.6
Social responsibility	−0.50	0.04
Consciousness	−0.23	0.02
Attitude to society	−0.24	0.7
Empathy	−0.25	0.04
Family relations	−0.25	0.7
Social participation	−0.10	0.8

bakeries that sell low-quality bread. Bakeries with high social health produce fewer low-quality breads. The amount of low-quality bread was higher in bakeries with 6 or fewer years of schooling than in others. Bakeries in the southern area produced lower-quality bread than those in other parts of Isfahan city.

Table 2 shows the relationships between pH (as an indicator of bread quality) and social health components. For the total score of social health, social responsibility consciousness, and empathy, these relationships were statistically significant (P values 0.05).

Age was excluded (P value = 0.890) from multiple model based on bivariate logistic regression between pH and studied variables. Table 3 shows the result of the multiple logistic regression analysis.

As shown in Table 3, lower and medium social health levels increase the odds of producing low-quality bread by 1.53 and 1.39, respectively, when compared to a higher social health level.

The OR for low bread quality in bakeries with 7–12 years of schooling was 1.27 compared to 12 and higher, indicating that years of schooling 7–12 increased the odds of baking low bread quality by 27%. The odds of baking low-quality bread

TABLE 3: Multivariate logistic regression between low bread quality and explanatory variables.

Variables	Coefficient	Odds ratio	P value	95% conf. int.	
<i>Social health</i>	Low	0.18	1.53	0.04	1.91–1.36
	Medium	0.16	1.39	0.01	1.93–1.37
	High*	—	1	—	—
<i>Years of schooling</i>	6 and lower	0.15	1.34	0.17	1.60–1.07
	7–12	0.29	1.27	0.05	1.11–1.06
	12 and higher*	—	1	—	—
<i>Working background</i>	10 and lower	0.53	1.61	0.02	3.51–1.54
	11–20	0.32	1.37	0.04	3.14–1.20
	Higher than 20*	—	1	—	—
<i>Ownership of bakery</i>	Rental	0.47	1.42	0.01	1.62–1.31
	Personal*	—	1	—	—
<i>District</i>	North*	—	1	—	—
	South	0.79	1.73	0.04	4.77–1.25
	East	0.47	1.69	0.31	4.03–0.63
	West	0.54	1.72	0.42	6.63–0.44
	Center	−0.24	0.78	0.02	0.88–0.29
Coefficient of determination		Pseudo- $R^2 = 0.2308$			
Likelihood ratio		$\chi^2 = 13.63$; P value = 0.025			
Pearson goodness of fit test		Pearson $\chi^2 = 99.23$; P value = 0.136			

*Denoting reference group.

decreased as the length of working experience increased. When compared to owning bakeries, having rental bakeries increased the odds of poor bread quality by 1.42. Compared to bakeries in the north, bakeries in the south and center had a higher (1.73) and lower (0.78) odds of producing low-quality bread, respectively. The Pearson χ^2 was used to estimate the goodness of fit. Pearson χ^2 showed no evidence of lack of fit ($P > 0.05$). The Pseudo- R^2 also revealed that the explanatory variables explained 23% of variance variation for low bread quality.

4. Discussion

The purpose of this study was to investigate the relationship between bread quality and the social health of bakeries in Isfahan. In terms of the relationship between social health and its components with bread quality, the correlation of total social health, social responsibility, consciousness, and empathy with bread quality was established. Furthermore, this study found that low and middle social health, 7–12 years of schooling; lower levels of working experience, rental ownership, and living in the south increased the odds of baking low-quality bread. Only one factor, including central location, was protective.

As it was evident, the use of baking soda (as a benchmark for bread quality) had a negative significant correlation with total social health and social responsibility, consciousness, and empathy. This means that poor social health has increased the likelihood of using more soda. Individuals who are more occupationally responsible, in terms of ethics, culture, and professionalism, act in ways that benefit the society [29]. Bakeries with a strong sense of social responsibility were more likely to be concerned about their surroundings and to produce higher-quality bread. In other words, bakeries that incorporate social responsibility, as well

as occupational health and safety [30], make it easier to produce high-quality bread.

Bakers who are conscious have precise and caring personality traits [31], and as a result, they consider baking high-quality bread as an occupational duty. In terms of empathy, the findings indicate that others share feelings and experiences [32] and that empathetic bakeries put themselves in the shoes of others, resulting in high-quality bread. Pay attention to these components, and social health as a whole can be regarded as a contributing factor in the production of desirable bread. Bakers with poor social health may not interact properly with society and the people around them, and they may lack a proper conscience. They might not care about diligence, discipline, punctuality, and perseverance. Furthermore, their scopes of duties and responsibilities, as well as their commitment to the rights of others, are limited [33].

The relationship between the bakers' education and bread quality showed that lower level of education increases the likelihood of producing low-quality bread. Individuals with higher education levels may have more learning opportunities and be more aware of the harmful effects of unauthorized additives in bread [34]. In addition, it is likely that the education system may institutionalize more responsibility of these individuals toward society.

In terms of the relationship between bread quality and baker experience, the results revealed that newer bakers had lower bread quality. Lower work experience is likely to be associated with lower skills. Bakeries with less experience, on the other hand, are less adapted to the difficult working conditions of the bakery; as a result, they have attempted to prepare bread dough using unhealthy and quick methods, such as the use of soda rather than the yeast process. Another variable investigated in this study was the relationship between bakery ownership and the quality of the bread

produced. The results revealed that the likelihood of producing low-quality products was higher in rental bakeries than in home-owned bakeries. The higher costs of the rental bakeries than those of the owners lead to the production of more quantities of bread with lower quality. Other possible explanations include the annual relocation of rental bakeries as a result of an unstable workplace, which leads to an unfamiliar and unsustainable relationship between bakers and local people. The current study examined the relationship between the quality of bread and the geographical location of bakeries. The finding showed that bakeries in the central district of Isfahan, rather than in the northern district, reduced the likelihood of low-quality bread baking. The central area has a traditional context and most people know each other, which can lead to more interaction between people and bakers. However, the location of bakeries in the south of Isfahan increases the likelihood of producing low-quality bread compared to the north. Because the southern area of Isfahan is more advantageous than the central part and because richer households live there, they consume less traditional bread [35] and are less concerned with its quality.

5. Limitations

The study's main limitation is its lack of generalizability. Given that the tested bread was only collected in the morning from traditional bakeries that used governmental flour, the results can only be generalized to bakeries with these three characteristics.

6. Conclusions

Bakers' social health is linked to the quality of bread due to their responsibility, consciousness, and empathy. This suggests that health policies should address social health in the performance of bakeries. It appears that, in the food industry, not only technical considerations and worker skills are important, but also paying attention to social health can lead to improved product quality. As a result, it is recommended that bakers receive education related to responsibility, consciousness, and empathy during their on-the-job training periods. Furthermore, investing in bakery education, promoting their skills, and providing facilities such as rental bakery loans would be beneficial.

Data Availability

The data are not publicly available due to privacy or ethical restrictions and are available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare are no conflicts of interest.

Authors' Contributions

Mostafa Amini-Rarani carried out analysis and interpretation of data and drafting of the manuscript. Seyed Haashem Abutoraabi contributed to conception, literature search, and

drafting of the manuscript. Mehdi Nosratabadi carried out conception and design and critical revision of the manuscript.

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