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ORIGINAL ARTICLE

Nutrition-related infodemic experiences of the adults admitted to a Family Health Center in Ankara, Türkiye

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ABSTRACT

Objective: The infodemic has been a global challenge in almost all aspects of life, including nutrition-related practices. Dissemination of infodemic originating from both online and offline sources might end with risky health behaviors. Defining the case provides an opportunity to manage the infodemic. In this study, we aimed to define the nutrition-related infodemic experiences of the individuals over the age of 18 who applied to a Family Health Center in Ankara.

Materials and Methods: This descriptive study investigated individuals admitted to the Family Health Center in Ankara, Türkiye, with data collected through a questionnaire developed by researchers and face-to-face interviews conducted between May and July 2023. Data analysis utilized SPSS version 23.0, employing binary logistic regression to assess associations between various variables and infodemic management.

Results: The study, involving 222 participants, involved a majority of females (63.1%), married individuals (65.3%), and non-working participants (62.9%). Health-related characteristics indicated that 44.4% had diagnosed diseases, while 64.9% engaged in physical exercise meeting World Health Organization recommendations, and 25.8% reported tobacco use. Infodemic exposure was notable, with 51.8% always checking information sources, and logistic regression revealed a significantly higher infodemic experience among individuals with diagnosed diseases (OR = 3.621, 95% CI 1.244 to 10.545, p = 0.018).

Conclusion: In summary, our study suggests the presence of an infodemic related to nutrition behavior within healthcare environments. Based on these findings, we advocate for proactive measures and structured initiatives to address infodemic challenges in healthcare settings. Moreover, we encourage future investigations to delve deeper into the underlying dynamics of this phenomenon.

Keywords: infodemic, nutritional status, patients

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INTRODUCTION

Infodemic is known to cause risk-taking behaviors that have the potential to harm health [1]. Infodemic can be in a physical and/or digital environment and include misinformation, disinformation, information voids, rumors, and conspiracy theories [2]. During the Coronavirus Disease 2019 (COVID-19) period, awareness about infodemic has gained momentum and infodemic management has been identified as a global priority by the Director of the World Health Organization (WHO) [3].

In its broader sense, infodemic has been studied on different health and disease-related topics, including noncommunicable diseases (NCDs). Noncommunicable diseases are responsible for almost 74% of deaths globally, and they include heart disease, stroke, cancer, diabetes, and chronic

lung disease. Unhealthy diets are among the major risk factors for NCDs [4]. Infodemic on unhealthy diets and nutrition-related topics may threaten health and cause unwanted consequences. In this regard, infodemic management might play a vital role in combating diet related NCDs.

There are good efforts to tackle misinformation on NCDs [5]. Since the COVID-19 pandemic, the spread of nutrition-related infodemic is known to have increased, coming from different sources, including social media sources [6]. Producing evidence for misinformation and disinformation produced about NCDs and risk factors might be helpful in infodemic management.

Family Health Centers are the first-level health institutions providing both preventive and curative outpatient services. Health/disease concerns and information-seeking behaviors of the individuals using these institutions are thought to be like those of the general population. In this regard, we aimed to define the nutrition-related infodemic experiences of the individuals over the age of 18 who applied to a Family Health Center (FHC) in Ankara.

METHODS

This descriptive study was conducted among the admitters to the Family Health Center (FHC), located in Ankara. 18-year-olds and older people admitted to the FHC who volunteered to participate in the study were included in the study. The FHC consists of six Family Health Units, and the study was conducted in one of these units. During the study period, a total of 2,115 individuals over the age of 18 applied to the selected unit.No sampling calculation was performed in the research; it was conducted with volunteers who applied within the specified date range.

A questionnaire including 22 questions in three sections including sociodemographic characteristics, health and disease profiles and information/infodemic status of the participants was developed by the researchers. A pretiral of the questionnaire was completed among 20 participants and due to the feedback obtained, revision of the questionnaire was made. Face-to-face data collection was completed between May and July 2023. Written informed consent was obtained from the participants.

SPSS 23.0 was used for data entry and statistical analysis. Marginal tables were presented to define the basic characteristics. People who did not use tobacco, did regular physical activity compatible with the WHO recommendations, perceived their nutrition behavior as healthy, and perceived their health status as very sufficient were assessed as "live healthy." Binary logistic regression analysis (Backward LR) was performed to analyze the associations between the infodemic management experience and selected variables. Variables in the model were selected as having a diagnosed disease, sex, marital status, level of information about nutrition, and living a healthy lifestyle. The selection of the model for logistic regression was done due to the literature review and the statistically significant association between the infodemic management experience and Odds Ratios (95% CI) were estimated for each variable. A p value less than 0.05 (two-sided) was accepted as statistically significant. SPSS version 29.0 Statistics software (IBM Corp., Armonk, NY, USA) was used in the data analysis.

Both the institutional official permissions from the Ankara Health Directorate Scientific Research Committee (Number: E-771-00003010926, Date: 10.08.2023) and Hacettepe University Non-Interventional Clinical Research Ethics Committee (Number: GO 23/342, Date:18.04.2023) were obtained before data collection. Informed consent was obtained from all participants.

RESULTS

222 individuals participated in the study. In Table 1, selected socio-demographic features of the participants were presented. The majority of the participants were female (n=140, 63.1%), married (n=145, 65.3%), and not working (n=139, 62.9%). Among the total, 58.2% of the participants declared their income status equal to their expenditure (n=128).

In Table 2, the characteristics of the participants related to their health status and behaviors were

Table 1. Socio-demographic features of the participants

Feature	Number	Percent
Sex (n=222)		
Male	82	36.9
Female	140	63.1
Marital status (n=222)		
Married	145	65.3
Not married	**77**	**34.7**
Occupational status (n=221)		
No	**139**	**62.9**
Yes	**82**	**37.1**
Income status compared to expenditure (n=220)		
Less	**59**	**26.8**
Equal to	**128**	**58.2**
Exceeds	**33**	**15.0**

shown. 44.4% of the participants had a disease diagnosed by the doctor (n=99). The majority of the participants perceived their health as very healthy and healthy (n=132, 60.0%). Nutrition status was perceived as very healthy and healthy among 113 participants (50.9%). The majority of the participants perceived their level of knowledge as sufficient (n=121, 56.0%). Perception of nutrition knowledge as sufficient among the total was 56.8% (n=125). Among the total, 64.9% of the participants were doing physical exercise compatible with the WHO recommendations (n=144). The tobacco use frequency was 25.8% (n=57).

Health and nutrition information sources of the participants were shown in Table 3. The Internet seems to be used as a frequent health and nutrition information source. Traditional newspapers, friends, and relatives are not very popular among information sources. TV channels, friends, and relatives follow internet-based sources used for both health and nutrition information.

In Table 4, participants' infodemic exposure and spreads risks were presented. Among the total, 51.8% of the participants always check the information source, 57.5% always check if the information is true, 44.1% always check if the information is updated, and 52.7% always share the information only if they are sure that it is true. There were participants sharing information with others without doing anything.

Table 2. Health status and behaviors of the participants

Feature	Number	Percent
Disease diagnosed (n=222)		
No	123	55.4
Yes	99	44.6
Use medicine (n=221)		
No	137	62.0
Yes	84	38.0
Perception about health status (n=222)		
Very healthy	17	7.7
Healthy	116	52.3
Not sure	53	23.9
Unhealthy	34	15.3
Very unhealthy	2	0.9
Perception about nutrition status (n=222)		
Very healthy	10	4.5
Healthy	103	46.4
Not sure	65	29.3
Unhealthy	41	18.5
Very unhealthy	3	1.4
Level of knowledge about health (n=216)		
Sufficient	121	56.0
Could not decide	41	19.0
Insufficient	54	25.0
Level of knowledge about nutrition (n=220)		
Sufficient	125	56.8
Could not decide	47	21.4
Insufficient	48	21.8
Physical activity status in accordance with WHO definition (n=222)		
Yes	144	64.9
No	78	35.1
Tobacco use (n=221)		
Never	120	54.3
Quitted	44	19.9
Currently use	57	25.8

Infodemic experience of the participants and their friends and relatives were presented in Table 5. Among the total, 18 participants had infodemic experience (8.1%). The frequency of infodemic experience of the participants' friends or relatives was 15.5% (n=34).

Table 3. Health and nutrition information sources of the participants (%)

Source	Always	Sometimes	Could not decide	Rarely	Never
Health information source					
TV (n=222)	18.9	36.0	1.4	18.5	25.2
Radio (n=219)	4.1	16.0	3.7	17.4	58.9
Traditional newspaper (n=220)	7.7	14.5	4.1	19.1	54.5
Internet-news (n=220)	**42.7**	**32.3**	3.2	10.9	10.9
Internet-any source (n=220)	**39.1**	**34.1**	4.1	7.7	15.0
Popular book (n=220)	6.8	22.3	6.8	24.5	39.5
Scientific paper (n=221)	10.4	22.6	5.0	18.6	43.4
Scientific book (n=220)	8.6	19.5	4.5	21.8	45.5
Friend (n=222)	24.3	40.1	8.1	14.4	13.1
Relative (n=222)	20.7	33.3	6.3	14.4	25.2
Nutrition information source					
TV (n=220)	20.9	36.8	1.8	14.5	25.9
Radio (n=219)	4.6	16.7	3.7	16.7	58.3
Traditional newspaper (n=220)	6.9	16.1	3.7	15.6	57.8
Internet-news (n=220)	**43.1**	**31.5**	3.7	9.3	12.5
Internet-any source (n=220)	**38.1**	**32.6**	3.7	10.1	15.6
Popular book (n=220)	7.8	18.8	8.3	20.6	44.5
Scientific paper (n=221)	10.1	22.0	4.6	18.3	45.0
Scientific book (n=220)	9.3	20.8	5.6	18.5	45.8
Friend (n=222)	19.7	41.7	6.9	14.7	17.0
Relative (n=222)	17.1	34.7	7.9	16.2	24.1

Table 4. Participants' infodemic exposure and spread risk (%)

Risk	Always	Sometimes	Could not decide	Rarely	Never
Check the information source (n=220)	**51.8**	30.0	4.1	5.5	8.6
Check if the information is true (n=221)	**57.5**	27.1	3.2	5.0	7.2
Check if the information is update (n=220)	**44.1**	33.2	6.8	6.4	9.5
Share the information with others without doing nothing (n=219)	7.8	21.5	13.7	13.7	**43.3**
Share the information with others if sure of its accuracy (n=220)	**52.7**	32.3	6.8	4.5	3.6

Table 5. Infodemic experience of the participants

Infodemic experience	Number	Percent
Personal experience (n=221)		
No	203	91.4
Yes*	18	8.1
About her/his current disease	*12*	
Food poisoning	*7*	
Experience of friends/relatives (n=220)		
No	186	84.5
Yes*	34	15.5
About her/his current disease	*17*	
Food poisoning	*16*	
**one experience detail is missing*		

In Table 6, infodemic experience of the participants is presented due to selected variables. Females, single people, and people with no children had an infodemic experience that was higher compared to males, married people, and people who had children ($p>0.05$). Participants with a diagnosed disease and used medicine had an infodemic experience with a higher frequency compared to those without a disease diagnosis ($p=0.015$). Participants who did not use medicine or control information sources and had a low level of health information had more infodemic experience compared to the others ($p>0.05$). People who lived healthy had a lower frequency of infodemic experiences than the participants who lived unhealthy ($p>0.05$).

Table 6. Features in association with infodemic experience

Variable	Infodemic experience				p
	No		Yes		
	Number	Percentage	Number	Percentage	
Sex					
Male	76	92.7	6	7.3	0.730
Female	127	91.4	12	**8.6**	
Marital status					
Married	135	93.1	10	6.9	0.349
Not married	68	89.5	8	**10.5**	
Have children					
No	76	89.4	9	**10.6**	0.294
Yes	127	93.4	9	6.6	
Physical activity (sufficient)					
No	71	91.0	7	**9.0**	0.739
Yes	132	92.3	11	7.7	
Currently tobacco use					
No	**152**	**92.7**	**12**	**7.3**	0.423
Yes	**50**	**89.3**	**6**	**10.7**	
Disease diagnosed by the doctor					
No	**117**	**95.9**	**5**	**4.1**	**0.015**
Yes	**86**	**86.9**	**13**	**13.1**	
Medicine use					
No	**131**	**95.6**	**6**	**4.4**	**0.08**
Yes	**71**	**85.5**	**12**	**14.5**	
Level of information about health (sufficient)					
Yes	**114**	**94.2**	**7**	**5.8**	**0.139**
No	**86**	**88.7**	**11**	**11.3**	
Level of information about nutrition (sufficient)					
Yes	**114**	**91.9**	**10**	**8.1**	**0.924**
No	**87**	**91.6**	**9**	**8.4**	
Control information source (always/sometimes)					
Yes	**166**	**92.7**	**13**	**7.3**	**0.276**
No	**35**	**87.5**	**5**	**12.5**	
Live healthy*					
Yes	**55**	**93.2**	**4**	**6.8**	**0.654**
No	**148**	**91.4**	**14**	**8.6**	

*Participants who do not use tobacco products, do physical exercise, perceive health status as very good and good, perceive nutrition behaviour as healthy

In Table 7, the existence of an infodemic experience is presented by having a diagnosed disease. Infodemic experience was statistically significantly higher among the people who had a diagnosed disease compared to the ones with no disease (OR=3.621, 95% CI 1.244 to 10.545, p=0.018).

Table 7. Logistic regression model for features in association with infodemic experience

Diagnosed disease	OR	95%CI	p value
No (ref)	**1.00**		
Yes	**3.621**	1.244-10.545	0.018
**Adjusted for sex, marital status, level of information about nutrition, living healthy*			

DISCUSSION

We aimed to define the nutrition-related infodemic experiences of individuals over the age of 18 who applied to a Family Health Center in Ankara. In the study conducted for this purpose, it was found that infodemic, which is known to cause risk-taking behaviors that have the potential to harm health [1], was defined by 18 participants (8.1%). The frequency of the infodemic experience of the participants' friends or relatives was 15.5% (n=34) (Table 5). Infodemic also known as "too much information," including misinformation, disinformation, information voids, conspiracy theories, etc., can cause harm [2]. The difference might be due to the fact that people may refrain from speaking about their own experiences. Or friends' infodemic experiences might have caused a memorably serious health problem, and they might have been more memorable for the participants.

Infodemic experience might be associated with a number of variables. We tried to investigate possible variables in our research. Within all, only participants with a diagnosed disease and used medicine had an infodemic experience with a higher frequency compared to those without a disease diagnosis (Table 6). However, the logistic regression model only confirmed the diagnosed disease variable (Table 7). Although the descriptive feature of the study does not allow us to present the cause-and-effect relationship between the variables, people with a diagnosed disease might have experienced an infodemic due to their health-seeking behavior from different sources, and this might have caused an infodemic experience. This is in line with findings by Scalvedi et al., which highlighted the reality that nutritional knowledge has a direct impact on eating habits and concluded that individuals with medical conditions can voluntarily seek information, increasing their ability to obtain misinformation [7]. Prieto also emphasized the reality that contradictory eating advice during the COVID-19 pandemic led to confusion and anxiety, primarily among risk groups [8]. The Internet seems to be the most frequent source of health and nutrition information, and TV channels, friends, and relatives follow internet-based sources used for both health and nutrition information. The traditional newspaper, friends, and relatives are not very popular among information sources (Table 3). Nutrition is among the popular misinformation themes spreading via social media. In their systematic review, Suarez-Lledo and Alvarez-Galvez found that 36% of the misinformation on diet-related issues has been found as 36% [9]. In this regard, examining infodemic related to diet and nutrition might contribute to better understanding the background dynamics. Denniss et al. pointed out the disparity between the accuracy and quality of the content on the internet with regard to nutrition, supplementing evidence that participants using multiple sources are more likely to be exposed to infodemics [10].

Wang et al. recommended examining the susceptibility of different groups to misinformation in their research conducted in 2012 [11]. Accordingly, Ruani and Reiss demonstrated that susceptibility to COVID-19 nutrition misinformation was linked to changes in food behaviors, particularly among people with reduced health literacy [12]. Their cross-sectional web-based survey indicated that exposure to false information influenced dietary choices, reflecting the importance of interventions addressing optimum critical thinking skills development in determining nutrition-related information. These findings further consolidate the importance of our study to ascertain the effect of misinformation on health-related action in different populations. Our research might have responded to this recommendation as it was conducted among the admitters of a FHC limited to their socio-demographic features and health/disease profiles (Table 1 and Table 2).

Almost one out of two participants (51.8%) always checked the information source. Additionally, 57.5% always check if the information is true, 44.1% always check if the information is updated, and 52.7% always share the information only if they are sure that it is true (Table 4). Results confirm that there is a need to support the participants in terms of infodemic management. Raising awareness and increasing the health and digital literacy

capacity of the participants might be helpful in this regard [2,13]. The complexity of the information environment [3,14] is a challenging issue, however, trusted and scientific-based methodologies will be helpful to reach our different populations either physically or digitally.

Our study has also strengths and limitations. Searching nutrition related infodemic status in a health center has been the strength of the study. We had a couple of limitations. The descriptive feature of the study has been a limitation and does not allow us to generalize the results. The participants' self-perception might not be as objective as they are observed through their real-life experiences. The number of participants did not allow us to conduct detailed further analysis.

In conclusion, we think that the study results are giving clues on the existence of infodemic related to nutrition behavior in health settings. In light of our findings, we recommend responding and organizing infodemic management activities in health settings. Additionally, further research is recommended to be carried out to better understand the dynamics.

Author contribution

Study conception and design: DA, DAB, EÇK, EA, and SEA; data collection: EÇK, EA, and SEA; analysis and interpretation of results: DA, DAB, EÇK, EA, and SEA; draft manuscript preparation: DA, DAB, EÇK, EA, and SEA; critical reading of the manuscript: DA, DAB. All authors reviewed the results and approved the final version of the manuscript.

Ethical approval

The study was approved by the Hacettepe University Non-Interventional Clinical Research Ethics Committee (Number: GO 23/342, Date: 18.04.2023).

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Conflict of interest

The authors declare that there is no conflict of interest.

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