

Research Article

Food Hygiene Knowledge, Practices, and Associated Factors among Food Handlers in Institutional Food Establishments in Nekemte Town, Western Oromia, Ethiopia: A Cross-Sectional Study

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For the general population, food hygiene is a growing public health concern. Lack of awareness of food hygiene knowledge and practices will lead to poor food handling, which may result in early mortality, food-borne illnesses, and death. To evaluate food handlers' knowledge, practices, and related aspects in various food enterprises in Nekemte town, Ethiopia, this study was designed. About 360 food handlers in the study area participated in a cross-sectional study that was based in an institution. Using methodical sampling approaches, the necessary sample was selected. Data were gathered using a semistructured questionnaire. For analysis, the data were entered in SPSS version 20.0. According to the study results, 57.8% and 35.75% of food handlers in the study area had inadequate food hygiene knowledge and practices, respectively. Secondary school or above: 2.42 (95% CI: 1.13, 3.56), training: 4.65 (95% CI: 1.847, 11.74), experience of 1–5 years: 2.12 (95% CI: 1.283, 3.83), and experience of more than 5 years: 2.11 (95% CI: 1.183, 5.34) were variables that significantly predicted knowledge of food hygiene. Similarly, secondary education or higher: 2.19 (95% CI: 1.202, 4.83), experience of more than 5 years: 2.4 (95% CI: 1.12, 6.96), knowledge of food hygiene: 2.61 (95% CI: 2.14, 4.56), and training 3.3 (95% CI: 2.32, 4.76) were correlated with food hygiene practice of food handlers. To improve food hygiene knowledge and practice as well as to overcome their associated factors, such as educational status, training, work experience, and knowledge of food handlers, all relevant bodies should apply all feasible interventions through behavioral change communication.

1. Background

Food hygiene is a practice used to ensure that food is soft, wholesome, and sound at all stages of production, including growing, producing, harvesting, transporting, storing, manufacturing, and final consumption. For both doctors and the general population, food hygiene is a growing public health problem [1]. Food contamination and its negative effects on our health can be avoided by practicing hygienic habits including washing hands before handling it, not sneezing or coughing over it, and avoiding handling with exposed wounds [2].

Food hygiene is still a major concern for both consumers and industry personnel in the food service industry [3]. To kill pathogens, it is important to store raw and cooked foods separately to avoid cross-contamination and to cook foods at the right temperature for the right time [4]. The most significant sources of microbial pathogens entering food come from people who handle it, either directly from their hands, hair, skin, and digestive tracts or from contaminated food they have prepared and served [5, 6]. A person who handles food professionally is someone who regularly comes into contact with it during manufacturing, processing, packing, and delivery of food, such as an inspector [7]. Food handlers

working in restaurants that have poor personal hygiene and are unaware of critical difficulties in preventing food-borne illnesses may be possible sources of infections with various intestinal protozoa and entheogenic pathogens [8].

The health of the community is impacted globally by food workers and anybody who handles food in any way [2]. Food hygiene practices and an understanding of the potential causes of food-borne diseases are crucial for everyone [9]. Handwashing with water and soap is one of the most efficient and affordable ways to prevent infections and food-borne diseases, and it significantly lowers the risk of bacterial contamination and food-borne illness [10]. Adequate personal hygiene practices are crucial for lowering the risks of food-borne illness. Up to 70% of instances of diarrheal infections are thought to occur in developing nations as a result of eating tainted food. The contamination of the food handler is to blame for 10–20 percent of occurrences of food-borne illness [7]. The World Health Organization [11] estimates that each year, contaminated food causes 1.5 billion instances of diarrhea in children, resulting in more than three million preventable deaths. If dangerous germs or physical dangers like hand watches come into touch with food, they may result in life-threatening health issues [12, 13].

In Ethiopia, coordination efforts are particularly lacking at lower levels of the government. Controlling, overseeing, and evaluating food handlers in food facilities are not a well-defined responsibility [14]. There are still very few records of food-borne illnesses throughout the African continent [15]. According to a study conducted in Nigeria, 37% of food handlers actively participated in cross-contamination behaviors that have the potential to result in food-related illness. One of the causes of inadequate food hygiene awareness was a lack of education and training [5]. An estimated 49.5% of food handlers in Ethiopia, according to similar studies, used poor food-handling techniques [16, 17]. Furthermore, in northwestern Ethiopia, 51.2% of food handlers exhibited poor food hygiene practices, and the availability of personal protective equipment, the presence of pipe water, and the presence of a supervisor were all significantly associated with grocers' food hygiene practices [18].

In the town of Nekemte, there are many catering establishments, and their number is occasionally growing. In addition, none of the town's eating places were aware of food hygiene methods or variables. There are a paucity of data on the skills and habits of food handlers and related variables influencing food hygiene in the city. There has not been much research on food hygiene in the study area's emerging institutions, particularly public universities, hospitals, and prisons, even though food-borne infections are a public health problem in Nekemte city [19]. Therefore, the primary goal of this study was to assess food handlers' knowledge of food hygiene across a variety of restaurants in Nekemte town. The results of this study will assist institutional food providers in setting goals and implementing workable interventions in the study region. By providing details on food hygiene knowledge, practices, and related factors among food handlers in institutional food establishments, it also

reports on the gap currently present for organizations and food handlers working in the area, how to solve the problem, and how to design mechanisms for next planning.

2. Materials and Methods

2.1. Descriptions of the Study Area. From September 2021 to July 2022, the study was carried out in Nekemte town, which is 331 kilometers from Addis Ababa. The Eastern Wollega zone's capital, Nekemte, is home to more than 110,688 people. There are seven subgovernment towns in Nekemte. There are numerous ethnic groups residing in the town. Oromo, Amhara, Gurage, Tigre, and other ethnic groups make up the majority of the population of the city. Nekemte city has a total population of 142,150 people, of which 72,497 are men, 69,653 are women, and 4,933 are pregnant women, according to the administrative population profile of the city. There are 29,615 flats in the town, with 4.8 people on average living in each one. There are 13 private hospitals, two state junior hospitals, two health centers, and three hospitals in the city. The town also houses a public university, a referral hospital, a special hospital, a prison, and 744 food handlers in total.

2.2. Study Design and Population. A cross-sectional study with an institutional focus was carried out. The baseline population consisted of all available food handlers from various restaurants in Nekemte, whereas the research population was methodically chosen from this group.

2.3. Sample Size and Sampling Techniques. A single population proportion calculation was used to determine the sample size, taking into account (p) of 67.4% [20]. According to the aforementioned report, this indicates that 67.4% of food handlers had poor food hygiene practices. The sample size was therefore determined using a margin of error (d) of 5% and a nonresponse rate of 10%. Therefore, according to the Cochran formula, the sample size is as follows: $n = (z^2 p (1 - p) / d^2)$, where p = the proportion of food handlers estimated to have a piece of certain knowledge, practices, dietary diversity, and associated factors, which was set at 67.4%, $q = 1 - p$, d = storable error of margin set at 0.05, and the minimum required sample size (n) estimate will be calculated as follows:

$$n = \frac{(1.96)^2 0.674 (1 - 0.674)}{(0.05)^2} = 337.6, \quad (1)$$

$$n = 338.$$

338 was the estimated sample size. The final sample size was 372, which was determined by adding 10% of the predicted sample size for a potential nonresponse rate. The study's sample methods were systematically chosen. The institutional dining facilities were divided into four distinct locations: Wollega University, Wollega University Referral Hospital, Nekemte Special Hospital, and Nekemte Jato Jail. So, using systematic selection approaches, 360 food handlers

with ages ranging from 18 to 60 were chosen from all of these institutional food establishments.

2.4. Variables and Measurements. Food handlers' knowledge and practice of food hygiene were the study's dependent variables, while the independent variables included socio-demographic factors such as age, sex, income, educational attainment, marital status, building ownership, food handlers' religion, ethnicity, service year, training, work activity, and work experience.

2.4.1. Knowledge. Respondents who answered more than 70% or more correctly were classified as good knowledge and poor knowledge if they scored less than 70% [21].

2.4.2. Practice. When a respondent received a score of greater than or equal to 70% on the food hygiene practice questions, their food hygiene practices were deemed to be excellent practices, and when they had a score of less than 70%, they were deemed to have bad practices [21].

2.5. Data Collection Methods. Elements of the questionnaire were created from previous research and adjusted for the study's focus. A structured and semistructured questionnaire was written in English and translated into Afaan Oromo to gather data. Under the direction of the primary investigator, professional data managers and collectors gathered the necessary information. Outside of the study area, the questionnaire was pretested. Strong leadership from immediate supervisors helped ensure the quality of the data. Daily questionnaire consistency and completeness checks were also performed by the supervisors. The lead researcher additionally double-checked the completed questionnaires for accuracy and kept track of 5% of the questioned families to make sure homes were being polled as intended.

2.6. Ethical Clearance. After reviewing the protocol, the Wollega University Institutional Review Board (IRB) gave its approval to all of the procedures (Reference RRC: No./WU/0342/2021). An official letter from the university informed the local authorities of the study. Respondents were accurately and completely informed of the study's procedures and their choice to opt out at any time. Each participant provided their written informed consent, and confidentiality was upheld throughout the study.

2.7. Statistical Analysis. The Statistical Package for Social Sciences (SPSS) was used to clean, code, and enter the raw data into the computer for further analysis. Using descriptive statistics such as the frequency, mean, and percentage, data on the sociodemographic features of food establishments, knowledge, and practices of food hygiene among food handlers were compiled. The links between

several regressions were further tested using multivariate logistic regression. Calculations were used to determine the 95% confidence intervals for the raw and adjusted odds ratios. In this investigation, a *P* value of 0.05 or lower was regarded as statistically significant.

3. Results and Discussion

3.1. Sociodemographic Characteristics of the Respondents. Food handlers between the ages of 18 and 25 made up the majority (62.9%) of the overall food industry (see Table 1). This outcome is inferior to that of research carried out in northwestern Ethiopia, which found that 85.6% of the study area's grocery store owners were female [18]. The sample size and the number of eating venues used in the current survey may be to blame for this disparity. Female food handlers made up 281 (75.5%) more of the total responders than male food handlers who made up 91 (24.5%). This result is in line with those of other Ethiopian research in which the majority of participants were women [18, 22, 23].

According to the study's findings, 217 (58.3%) of the participants had less than a year of expertise in food hygiene. This result is comparable to one from Addis Ababa, which revealed that 52.2% of respondents had worked for less than a year [22]. The current survey's findings, however, are better than those of a study carried out in the Ethiopian city of Gondor, where it was discovered that about 34.9% of the respondents had less than one year of experience [24]. The availability of information, socioeconomic traits of the participants, environment, and sample size employed in the current survey could all play a role in this disparity.

About 274 (73.66%) of the participants in this study did not take food-handling training. This study's findings differ from those of a study carried out in Addis Ababa, which found that 83.8% of grocery store employees lacked any training in safe food handling [22]. It is also higher than research conducted in Ghana, which revealed that 56% of food handlers had not taken a course on food safety [25]. In addition, over 275 (73.92%) of the grocery stores reported average annual incomes between 500 and 1000 ETB. This study's findings were better than those of studies conducted in Fiche [16] and northwestern Ethiopia [18], which found that among grocery store owners with monthly incomes of less than 1000 ETB, 23% and 56.9%, respectively, were poor. This variation may be explained by the study time, socioeconomic factors, and ability to make money from eating places in the study location.

3.2. Food Hygiene Knowledge. This survey found that when food was contaminated, about 115 (30.9%) of the respondents cleaned their hands. In addition, 143 respondents, or 38.4%, reported not washing their hands before preparing or serving meals (see Table 2). Moreover, the poor food hygiene knowledge scores for food processors were 215 (57.8%) (see Table 2). The results of this study are more significant than those of studies carried out in Ghana (32.7%), Nigeria (19% [26]), and the Tigray region of Ethiopia

TABLE 1: Sociodemographic characteristics of food handlers in Nekemte town, Ethiopia, 2022 ($n = 372$).

Variables	Categories	Frequency (n)	Percent (%)
Sex	Male	91	24.5
	Female	281	75.5
Age in years	18–25	234	62.9
	26–35	98	26.3
	36–45	31	8.3
	46–60	9	2.42
Religion	Protestant	212	57.0
	Orthodox	73	19.6
	Muslim	40	10.75
	Wakefata	47	12.6
Marital status	Single	318	85.48
	Married	50	13.44
	Divorced	4	1.1
Educational status	No education	16	4.3
	1–9 grade	136	36.6
	Secondary school	87	23.4
	College and above	133	35.75
Training	Yes	98	26.34
	No	274	73.66
Work experience in years	Less than one	217	58.33
	One up to five	124	33.33
	More than five	31	8.33
Average monthly income	500–1000 ETB	275	73.92
	1001–1500 ETB	70	18.82
	Less than 500 ETB	27	7.25
Work activity	Waiter	162	43.54
	Cooker	133	35.75
	Butcher	31	8.33
	Washer	46	12.36
Ethnicity	Oromo	322	86.56
	Amhara and others	50	13.44

Note. ETB; Ethiopian birr.

(26.3%) [25, 26]. The results, however, are less favorable than those of research conducted in India (74.7%) and the Amhara area of Ethiopia (64.9%). The sample size and sociodemographic characteristics of food handlers involved in various food establishments of various research studies may be the cause of this disparity.

3.3. Food Hygiene Practice. About 331 (88.99% of food handlers in this study) used plastic as chopping boards. In addition, the majority of respondents (321) (86.3%) washed their hands before cooking (see Table 3). Besides, only around 133 (35.75%) of the food processors practiced good food hygiene. The findings of this study are less significant than those of investigations carried out in Gondar, Ethiopia [24], central Ethiopia [16], northwest Ethiopia [20], by Alemayehu et al. [16], and Nigeria [26]. This study's low level of food hygiene standards is also typical of research conducted in Addis Ababa, Ethiopia, and the Amhara area (51.2% [18] and 72.6% [22], respectively). This can be a result of food handlers receiving adequate knowledge as well as the experience and instruction supplied by the municipal municipality.

3.4. Associated Factors of Food Hygiene Knowledge of Food Handlers. In the multivariate analysis of this study, the variables with a significant association with food hygiene knowledge were secondary school or higher: 2.42 (95% CI: 1.13, 3.56), exercise: 4.65 (95% CI: 1.847, 11.74), experience of 1–5 years: 2.12 (95% CI: 1.283, 3.83), and experience of more than 5 years: 2.11 (95% CI: 1.183, 5.34) (see Table 4).

The study discovered that food handlers with at least secondary education were 2.42 times more likely to possess knowledge of food hygiene than individuals with no formal education or limited literacy. This result is in line with research conducted in Ethiopia [20] and Bangladesh [27]. This might be the case since improving food handlers' awareness of food safety and cleanliness depends greatly on the education level of grocery store employees. Furthermore, food processors with food hygiene training were 4.65 times more likely to be knowledgeable about food hygiene than those without it. This result is in line with those from Bangladesh [27] and Ethiopia [20]. This might be because diverse training can guarantee that food workers in various food companies are knowledgeable.

TABLE 2: Food hygiene knowledge of food handlers in Nekemte town, Ethiopia, 2022 ($n = 372$).

Variables	Categories	Frequency (n)	Percent (%)
How should food handlers control contamination?	Keep the floor and walls	145	38.97
	Wash hands and do not touch ready-prepared food with bare hands	114	30.64
	Keep hot food and cool food	113	30.37
When do food handlers wash their hands during food preparation?	Every 30 minutes	161	43.29
	When contaminated	115	30.91
	I do not know	96	25.8
What should food handlers avoid during food preparation?	Touching the nose, ear, and body	215	57.80
	Not touching the nose, ear, and body	157	42.20
What do food handlers use to wash their hands?	Designated sink	222	59.67
	Sanitizer bucket	150	40.32
When should food handlers wash their hands?	Before food prepared	172	46.238
	After food prepared	122	32.79
	In between food preparations	78	20.96
What should be used for drying hands?	Use a hand dryer	203	54.56
	Use a paper towel	169	45.43
Why is food hygiene important?	Reduce workplace accidents	113	30.37
	Reduce the amount of food thrown away	88	23.65
	Prevent illness through food	149	40.05
	Reduce the number of complaints from customers	22	5.91
Is it necessary to wash your hands before making or serving food?	Yes	135	36.29
	No	143	38.44
	I do not know	94	25.26
Overall food hygiene knowledge status	Good	157	42.20
	Poor	215	57.79

TABLE 3: Food hygiene practice of food handlers in Nekemte town, Ethiopia, 2022 ($n = 372$).

Variables	Categories	Frequency (n)	Percent (%)
Types of chopping boards used by food handlers	Wood	331	88.99
	Plastic	41	11.01
How do food handlers avoid cross-contamination of chopping boards?	Wash them with detergent and hot water	167	44.89
	Use dishwasher	125	33.6
	Use color-coded	80	21.51
How should food handlers wash dirty knives?	Detergent and hot water	198	53.23
	Wipe with a damp cloth	44	11.82
How do food handlers clean their workstations?	Liquid soap	102	27.42
	Use detergent	130	34.93
	Sanitizer	140	37.63
Do you wash your hands before cooking?	Always	321	86.3
	Sometimes	51	13.71
Do you wash your hands after using the toilet?	Always	332	89.25
	Sometimes	40	10.75
You keep your cooking surroundings clean	Always	301	80.91
	Sometimes	71	19.1
You clean cooking surfaces as you work	Always	318	85.48
	Sometimes	54	14.52
You use soap for hand washing	Always	225	60.48
	Sometimes	134	36.02
	Never	13	3.5
Overall food hygiene practice	Good	239	64.25
	Poor	133	35.75

TABLE 4: Bivariable and multivariable logistic regression analysis of associated factors with food hygiene knowledge among food handlers in Nekemte town, Ethiopia, 2022 ($n = 372$).

Variables	Categories	COR (95% CI)	AOR (95% CI)
Sex	Male	2.115 (1.412, 6.874)*	1.838 (0.89, 5.674)
	Female	1	1
Age in years	18–25	0.395 (0.043, 0.95)*	0.195 (0.043, 2.14)
	26–35	0.25 (0.022, 1.912)	2.21 (2.32, 7.146)
	36–45	0.82 (0.023, 2.757)	0.556 (0.318, 0.975)
	46–60	1	1
Marital status	Single	1	1
	Married	1.068 (0.550, 2.074)	1.068 (0.55, 2.074)
	Divorced	2.768 (3.009, 15.223)	1.418 (0.72, 7.146)
Educational status	No education	1	1
	1–9 grade	0.556 (0.318, 0.975)	0.23 (0.218, 0.875)
	Secondary school and above	2.764 (1.335, 3.743)*	2.42 (1.13, 3.56)**
Training	Yes	5.113 (2.549, 10.260)*	4.65 (1.847, 11.741)**
	No	1	1
Work experience in years	Less than one	1	1
	One up to five	2.76 (1.335, 4.743)*	2.12 (1.283, 3.826)**
	More than five	2.31 (1.283, 5.826)*	2.11 (1.18, 5.34)**
Average monthly income	500–1000 ETB	2.603 (1.278, 5.301)*	3.2 (0.98, 5.027)
	1001–1500 ETB	1.992 (1.328, 12.095)*	1.23 (0.328, 12.095)
	Less than 500 ETB	1	1
Work activity	Waiter	2.190 (1.021, 4.698)*	0.160 (0.047, 0.541)
	Cooker	1.008 (0.465, 2.188)	0.198 (0.063, 0.628)
	Butcher	0.354 (0.081, 1.547)	0.496 (0.090, 2.730)
	Washer	1	1

Note. *Significant at $P < 0.05$; **significant at P value < 0.001 ; AOR, adjusted odds ratio; COR, crude odds ratio, ETB; Ethiopian birr.

Besides, participants with one–five years of work experience and those with more than five years were nearly twice more likely to have knowledge of food hygiene than those with no experience. This outcome is in line with research conducted in Bangladesh [27]. This may be because food handlers with more job experience have better awareness of food safety and hygiene.

3.5. Associated Factors of Food Hygiene Practice of Food Handlers. The findings of this study showed that secondary education and above, exercise, experience of more than five years, knowledge of food hygiene, and experience of more than two years were significantly associated with food hygiene practices (see Table 5).

According to this study's findings, food handlers who have completed at least a secondary school are 2.6 times more likely to practice proper food hygiene than those who have not (see Table 5). This outcome is in line with research conducted in Ethiopia [16, 17, 28–30]. This may be because food processors' educational background affects how they handle food hygiene in dining facilities. In addition, those who have received instruction in food hygiene are 2.19 times more likely to practice it than those who have not. This outcome is consistent with those of other Ethiopian investigations [17, 20, 30, 31] and India [32]. This implies that trained food workers follow proper food hygiene procedures. In addition, people who had handled food for over five years were 2.4 times more likely to practice good hygiene than those with no experience. This is in line with research

conducted in Bangladesh [27] and Ethiopia [20, 29, 33]. This might be because experienced food handlers are better at practicing good food hygiene than less experienced ones.

Furthermore, those who handled food well were 3.3 times more likely to follow appropriate food hygiene practices than those who did not (see Table 5). The findings of this study are in line with those of investigations carried out in Bangladesh [27] and Ethiopia [16, 17, 20, 23]. It is a proven reality that knowledgeable food handlers may enhance food hygiene procedures, comprehend food safety, and learn all other pertinent facts.

3.6. Limitations and Future Research Implications. The tiny population sample size limits the results of our investigation. The results may not adequately reflect the knowledge and habits of food handlers because the study was only conducted once. Furthermore, because this study was cross-sectional, no causal connection between the predictors and the outcome variables could be proven. This study did not include food vendors because it was conducted at institutional eating places. Therefore, it is suggested that future researchers conduct this research in a new setting, possibly involving various sorts of grocery stores, such as food vendors who perform microbiological analyses. The frequency of food hygiene knowledge and practices among university, hospital, and jail food handlers was evaluated in this institutional cross-sectional survey. To determine the key variables influencing food hygiene knowledge and practice, the study used a variety of conventional

TABLE 5: Bivariable and multivariable logistic regression analysis of associated factors with food hygiene practices among food handlers in Nekemte town, Ethiopia, 2022 ($n = 372$).

Variables	Categories	COR (95% CI)	AOR (95% CI)
Sex	Male	0.467 (0.190, 1.145)	0.838 (0.419, 2.114)
	Female	1	1
Age in years	18–25	2.51 (1.045, 5.514)*	0.34 (0.065, 3.32)
	26–35	0.667 (0.237, 1.873)	0.21 (0.43, 2.67)
	36–45	0.250 (0.023, 2.757)	0.896 (0.991, 1.067)
	46–60	1	1
Marital status	Single	1	1
	Married	0.52 (0.035, 3.514)	1.52 (0.485, 3.886)
	Divorced	0.689 (0.218, 1.651)	1.418 (0.32, 7.146)
Educational status	No education	1	1
	1–9 grade	0.143 (0.032, 0.629)*	0.12 (0.0242, 1.966)
	Secondary school and above	3.64 (2.143, 8.511)*	2.61 (2.14, 4.56)*
Training	Yes	3.13 (2.24, 5.955)*	2.19 (1.202, 4.83)**
	No	1	1
Work experience in years	Less than one	1	1
	One up to five	2.500 (1.485, 12.886)*	2.11 (0.981, 8.134)
	More than five	2.893 (4.366, 10.919)*	2.42 (1.12, 6.96)**
Work activity	Waiter	1.667 (0.398, 6.974)	0.667 (0.076, 5.878)
	Cooker	1.500 (1.251, 8.977)	1.03 (0.366, 10.919)
	Butcher	1.467 (0.598, 7.614)	1.333 (0.298, 5.957)
	Washer	1	1
Knowledge of food hygiene	Good	3.67 (2.298, 5.957)*	3.3 (2.32, 4.76)**
	Poor	1	1

Note. *Significant at $P < 0.05$; **significant at P value < 0.001 ; AOR, adjusted odds ratio; COR, crude odds ratio, ETB; Ethiopian birr.

questionnaires and logistic regression analysis. By incorporating qualitative research, future researchers can use these findings to include other aspects that were not examined in this study.

4. Conclusion

According to the study's findings, there were 57.8% and 35.75%, respectively, of people in the study region who had inadequate food hygiene knowledge and practice. This result is higher than that of previous research carried out around the nation. In addition, secondary education and above, education, and job experience were the variables linked to awareness of food hygiene in the multivariate analysis of this study. Similarly, secondary school and higher, awareness of food hygiene, work experience, and education all substantially correlated with food hygiene behaviors. Therefore, to decrease food-borne illnesses and associated health issues, all responsible bodies have to address issues related to food hygiene knowledge and practice in various food outlets.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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