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COVID-19 Protective Behaviors: The Role of Living Arrangements and Localities

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Abstract

Objectives: Guided by the human-ecological model, we aimed to identify contextual factors related to protective behaviors during the COVID-19 outbreak. **Method:** Data are based on a nationally representative survey of adults aged 50+ in Israel during the COVID-19 outbreak ($N = 1{,}019$). Regression models predicted three behaviors: using hand sanitizers and masks, stocking up food, and avoiding social meetings. The independent variables were living arrangements (microsystems) and type of localities (macrosystems). **Results:** Participants who lived alone or lived in rural localities were less likely to adopt protective measures. **Conclusion:** Policy makers should pay particular attention to adults who live alone or live in rural areas as they might be less likely to adopt protective behaviors and face higher health risks during the pandemic.

Keywords

coronavirus, rural localities, living alone

Introduction

The COVID-19 pandemic requires the adoption of new protective behaviors against infections. Older adults have been particularly advised to maintain behaviors such as handwashing and mask wearing, as they face increased health risks from the virus (Remuzzi & Remuzzi, 2020). Authorities have also recommended people to stock up on food to limit going outside of their home (World Health Organization, 2020). An additional recommendation is the maintenance of social distancing, by minimizing face-to-face interactions outside of one's household.

The contexts in which people live and operate can have far-reaching implications for their behaviors. This is particularly true for the COVID-19 pandemic, which has very different manifestations, at least partially attributed to external contexts (e.g., Henning-Smith, 2020; Luchetti et al., 2020; Mollalo et al., 2020). The human ecology perspective looks at ways in which people are influenced by external conditions and environments (Bronfenbrenner, 1986; Wahl & Gerstorf, 2018). It posits that ecosystems provide the environment in which individuals develop and interact. These systems are differentiated based on their distance from the person. The current study focused on the effects of the microsystem and macrosystem with a particular focus on the living environment.

The microsystem examined in this study concerns the living arrangements of adults. Those who live alone might find it difficult to adopt behaviors related to the pandemic, especially social distancing and refraining from meeting others not from one's household. They can face a difficult dilemma because avoiding social contacts might entail loneliness and mental distress (Cohn-Schwartz et al., 2020; Tyrrell et al., 2020), and they can perceive loneliness as a barrier to implementing social isolation guidelines (Callow et al., 2020). However, although evidence suggests that living arrangements are associated with loneliness during the pandemic (e.g., Parlapani et al., 2020; Tyrrell et al., 2020), less is known about their effects on adhering to guidelines. Supporting this premise, a study in Italy found that the pandemic was worse in regions where more people lived alone (Liotta et al., 2020), perhaps indicating they were more likely to disregard the guidelines.

The macrosystems of locality in which people live could also be related to protective behaviors. Adults may differ based on living in an urban or a rural setting. Research in the United States suggests that adults in rural settings may face heightened COVID-19 risks due to their worse health and impaired access to health care (Centers for Disease Control

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and Prevention, 2020). However, there are indications that they implement less COVID-19 behaviors compared with urban dwellers. American rural adults reported less use of cloth face coverings and adults in rural areas in Ethiopia and Bangladesh reported lower practice regarding COVID-19 (Wake, 2020). These studies are limited because they either examined one type of behavior or joined several behaviors, without a separate examination of different behaviors. In addition, these studies were conducted in specific national contexts in which rural–urban differences may not be representative of the experiences in other countries.

It is necessary to also examine the peripherality of localities. Living in peripheral areas (i.e., areas distant from population concentrations and centers of economic activity) can entail less access to health resources and make people feel less safe, potentially promoting the adoption of more protective behaviors. The peripherality aspect needs to be separated from other relevant characteristics, such as lower crowdedness.

Israel presents an interesting case study, as it has both urban and rural localities in peripheral locations, and these differ in relevant aspects such as crowdedness and community support. Thus, those who live in rural localities may feel less threatened by the virus, as rural settings tend to be less crowded. Peripherality, on the contrary, could be associated with higher adherence due to distance from health care centers.

To sum, the current study explores external factors that might be related to COVID-19 protective behaviors. We hypothesize that adherence will be higher among people who live with others and among those who live in peripheral and urban localities.

Method

Participants and Procedures

Data are based on a nationally representative survey of 1,092 adults aged 50 and above in Israel. Telephone surveys were conducted in Hebrew between March 29 and May 3, 2020, during which Israel employed partial lockdown due to the COVID-19 outbreak. The study was approved by a university ethics committee. At the beginning of each interview, participants were read an introductory statement explaining that answering the questions serves as consent to participate and that they can stop the survey at any time. Thus, their responses to the survey were considered as their consent. The ethics committee formally approved this consent. The sample for the current study consisted of 1,019 adults who responded to all the study variables. Participants without full information were less healthy and more likely to be women.

Measures

COVID-19 behaviors. We asked participants which behaviors they adopted to reduce exposure to the virus: using hand sanitizers and face masks, stocking up food for emergency, and avoiding meetings with family and friends. Response options were (a) "No," (b) "Somewhat," and (c) "A lot." The "avoid meetings" variable had few responses in the "No" category (1.7%); thus, we dummy coded it by grouping the "No" and "Somewhat" responses into one category.

Living arrangement. The interviewers asked participants with whom they lived. We coded responses into "living alone," "living with 1 person," and "living with 2+ people."

Location. *Peripherality index* was calculated in 2015 by the Israeli Central Bureau of Statistics. The index characterizes localities and local authorities in Israel by geographic location, relative to population concentrations and centers of economic activity. The index ranges from 1 to 10, with higher scores indicating less peripherality. We created a dichotomized locality variable of *urban\rural localities* based on the classification of the Israeli Central Bureau of Statistics, which defined urban localities as having more than 2,000 inhabitants and rural localities as having less than 2,000 inhabitants.

Covariates. Background information was gathered using age (a continuous variable), gender, years of education, employment status (employed\not employed), and the extent to which respondents' household can make ends meet financially. We asked about self-rated health and a count of four chronic illnesses: diabetes, high blood pressure, heart problems, and arthritis. We also divided respondents into two categories based on the date of response—March 29 to April 17, 2020 (restrictions and lockdown)\April 19 to May 3, 2020 (easing of restrictions).

Statistical Analyses

Analyses included descriptive data and bivariate analyses with the dependent variables (χ^2 tests*t* tests\Spearman correlations). The main analyses were three regression models that predicted each of the dependent variables using the independent variables and covariates. We predicted variables with three categories using generalized ordered logit regressions as they did not meet the proportional odds assumption of ordered logit models, which allow inconsistent estimates to vary across levels (Williams, 2006). We predicted the binary variable "avoid meetings" using a logistic regression.

Results

Table 1 shows the sample characteristics. Participants were aged 64 on average, about half were women, had high education, reported good financial status and good health, and half were employed. Over half reported stocking up food, over 70% reported using hand sanitizers and masks, and over 90% avoided meetings. Less than a fifth lived alone. They had an

Table 1. Sample Characteristics.

Variable	*M* (*SD*)\%	Range
Stocking up food		
No	45.41	
Somewhat	42.39	
A lot	12.20	
Hand sanitizer and masks		
No	5.41	
Somewhat	22.73	
A lot	71.86	
Avoid meetings	91.36	
Age	63.73 (9.16)	50–91
Gender: Women	47.11	
Years of education	14.74 (3.02)	0–30
Financial status	2.59 (0.97)	1–4
Employment: Employed	51.82	
Self-rated health	3.13 (1.03)	1–5
Chronic illnesses	0.70 (0.89)	0–4
Time: Easing restrictions	81.94	
Living arrangements		
Live alone	18.13	
Live with 1 person	66.30	
Live with 2+ people	15.57	
Peripherality index	7.05 (2.20)	1–10
Locality: Rural	8.83	

average peripherality index of 7, indicating less peripheral localities, and 9% lived in rural localities.

Table 2 shows bivariate associations with the outcome variables. Those who lived with others were likely to stock up food and avoid meetings. Rural localities were related to a lower likelihood of using hand sanitizers and masks and stocking up food.

The main stage of analysis was regressing COVID-19 behaviors on the independent variables (Table 3). The first outcome variable was using hand sanitizers and masks. Participants were less likely to report such behaviors if they lived in rural localities (macrosystems). The second outcome variable was stocking up food and it was related to both micro- and macrosystems. Adults were more likely to report stocking up food if they lived with two or more individuals, versus those who lived alone, and if they lived in urban localities. The third outcome variable was avoiding meetings, which was associated with not living alone. The negative association with rural localities was marginally significant ($p = .054$).

Discussion

This study showed that the contexts in which people live are meaningful to the adoption of protective behaviors during the COVID-19 pandemic. In line with the human-ecological perspective, the findings indicate that different levels of systems are related to such behaviors. Adults were more likely to engage in protective behaviors if they lived with others and if they lived in urban (vs. rural) localities.

Living with other people was associated with avoiding face-to-face meetings, and living with two or more people was related to stocking up food. Adults who live alone could find it more difficult to avoid meeting others people, as they lack companionship at home. This highlights their "double jeopardy" during the COVID-19 crisis—they risk loneliness and health problems if they maintain social distancing (Weissman & Russell, 2018), and risk infections if they don't (Luchetti et al., 2020; Tyrrell et al., 2020). Another explanation of these results could be that cohabiting others remind the older adult to stay at home and enforce the restrictions.

The macrosystem of locality was also relevant, as adults in rural localities reported less COVID-19 behaviors. Rural localities tend to have more open spaces and their older residents may perceive this as safeguarding them from infections, without a need to use precautions. Cities are denser. Hence, precautions may seem more relevant in urban settings. This distinction can become more salient in Israel, in which rural areas often enjoy better accessibility to health services (Vitman-Schorr et al., 2019). Some rural areas elsewhere in the world might also enjoy better health. For example, a study in the United States found negative health effects of rurality only in the South region, whereas positive health effects were found in the Midwest region, possibly due to lower levels of rural poverty (Ziembroski & Breiding, 2006). Thus, the health effects of rurality during COVID-19 might be related to the resources and sociodemographic characteristics of the area.

Study limitations include lack of information on neighborhood within cities, which may have attenuated our findings (Yuekang et al., 2020). In addition, we collected data for a month during the "first wave" in Israel. Thus, future studies should examine behavior changes during later stages of the pandemic. We also note that the variable of hand sanitizers and face masks enquires about two behaviors, making it difficult to discern which behavior the participant is endorsing. Future research should also add an open-ended or "other" category to the response choices of the protective behaviors.

To sum, living in certain contexts can increase the odds of adoption of COVID-19 protective behaviors among older adults. These results can guide policy, services, and intervention programs during the pandemic. (We note that these recommendations are based on 18% of the sample living alone and 9% residing in a rural location.) Particular attention should be paid to adults who live alone and may struggle to maintain social distancing. Interventions such as home-delivered meals, online group activities, and telehealth should protect their health while alleviating some of their social isolation. There is also a need for effective messaging around the benefits of protective behaviors targeting rural areas. Such attention should be even greater when case numbers rise, as happened in Israel during the "second wave" around September to October 2020.

Table 2. Bivariate Analyses of the Study Variables.

	Bivariate analyses		
Variable	Stocking up food	Hand sanitizer and masks	Avoid meetings
Stocking up food			
Hand sanitizer and masks	$r_s = .15$***		
Avoid meetings	$t = -5.27$***	$t = -4.34$***	
Living arrangements	$\chi^2 = 35.30$***	$\chi^2 = 6.78$	$\chi^2 = 8.50$*
Live alone			
Live with 1 person			
Live with 2+ people			
Peripherality index	$r_s = .01$	$r_s = -.03$	$t = 0.52$
Locality: Rural	$t = 2.96$**	$t = 2.22$*	$\chi^2 = 2.76$

*$p < .05$. **$p < .01$. ***$p < .001$.

Table 3. Regression Models of COVID-19 Protective Behaviors.

	Hand sanitizers and masks (generalized ordered logit model)		Stocking food (generalized ordered logit model)		Avoid meetings (logistic model)	
Variable	OR	*p*	OR	*p*	OR	*p*
Living arrangement						
Live with 1 person[a]	1.18	.372	1.03	.875	1.98	**.010**
Live with 2+ people[a]	1.30	.331	2.70	**<.001**	4.15	**.001**
Locality						
Peripherality index	0.96	.207	0.99	.836	0.93	.206
Locality: Rural	0.48	**.004**	0.51	**.005**	0.48	.054
R^2		.051		.050		.038

Note. OR = odds ratio. Boldface values indicate significance at $p < .05$.
[a]Reference: living alone; all models control for age, gender, years of education, financial status, employment, self-rated health, chronic illnesses, and time in the pandemic.

Authors' Note

Institutional review board approval was obtained from the ethics committee of the School of Social Work in Bar Ilan University (Approval No. 061902).

Declaration of Conflicting Interests

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