Health Behaviors – Changes over Time and Patterns within Couples. Preventive Behaviors among Elderly during Different Stages of COVID-19 Pandemic

Marta Styrc, SGH Warsaw School of Economics
Martin Piotrowski, University of Oklahoma

ABSTRACT

During the COVID-19 pandemic, understanding the drivers of health behaviors became crucial for public health. Using SHARE data collected during the pandemic, this study investigated how partners influence each other's compliance with preventive guidelines, and how prior behaviors affect future compliance. Compliance was measured through latent class analysis of safety behaviors in 2020 and vaccination status in 2021. Logistic regression was used to analyze how partner compliance affected individual compliance.

Both men and women were less compliant if their partners were non-compliant and more compliant if their partners were compliant, in terms of both safety behaviors and vaccination. These effects were similar for both men and women. Individuals who were more compliant in 2020 were also more likely to be vaccinated in 2021, indicating that prior behaviors predict future compliance.

These results suggest that individuals who were reluctant to follow guidelines may also be non-compliant with different measures. Negligence at early stages may have long-term consequences, especially if those who are unconvinced are more easily lost. The analyses could not distinguish whether these results represent individual reluctance or a failure of institutions. With future health threats, identifying and targeting reluctant individuals early may increase the efficacy of public action. This study contributes to the understanding of the drivers of health behaviors during the pandemic. Further research should explore the reasons for compliance, including individual attitudes versus institutional factors.

EXTENDED ABSTRACT

Introduction

During the COVID-19 pandemic two types of actions were recommended to protect individual and community health: (1) preventive measures to reduce virus transmission and (2) vaccination. Despite the urgency of the situation some individuals were not complying with the recommendations or they were adhering to them only partially. Understanding what drives health-related behaviors is crucial from the point of view of public health especially during pandemic when individual behavior causes immediate societal health costs. The data referring to this particular period provides a unique possibility to investigate what drives health behaviors and what are their consequences. With this study we would like to contribute to an understanding of what matters with respect to shaping individual health decisions.

Using SHARE data collected during the pandemic, we attempt to answer the following questions:

1. How is health behavior of an individual affected by the behavior of his/her partner?
2. Do the effects of the partner on health behaviors differ by sex?
3. How much does past behavior affect the current behavior of a person?

Ad 1) In the existing literature having a partner has been shown to have a positive effect on a person's health through a number of mechanism: social control, social support, social integration (Drefahl 2012; House, Landis, & Umberson, 1988; Rendall et al. 2011; Umberson 1992; Umberson, Donnelly, Pollitt 2018). In addition it has been shown that the (un)healthy behaviors of a person influence his/her partner's behavior in the same direction (Jackson, Steptoe, Wardle 2015). In line with the available evidence we assume that also the behaviors related to infection prevention during COVID-19 pandemic will be also more consistent between partners. We expect that an individual will be less compliant to preventive behavior guidelines recommended during the pandemic (i.e., vaccination and general compliance) if his/her partner is less compliant. Alternatively, a person is more compliant if his/her partner follows the recommendations (H1).

Ad 2) Both, men and women, benefit in terms of health from being in a partnership but men benefit more (Goldman et al. 1995; House et al. 1988; Kaplan and Kronick 2006; Kiecolt-Glaser and Newton 2001; Rendall et al. 2011). The available explanation for this unevenness is that women are usually in charge of health behavior within a partnership and tend to control partner's health behavior more often (Thoits 1992; Umberson 1987). If the within household responsibility of women for health behaviors extends also to the safety measures during pandemic, women can be assumed to set the tone with respect to preventive behaviors and COVID-19 vaccination. Thus, we expect the women's effect on the partners behavior is stronger than men's (H2)

Ad 3) Health decisions are usually shaped by factors related to perceived severity, susceptibility, benefits and barriers, self-efficacy and cues to action (Bordalo, Coffman, Gennaioli, & Shleifer, 2020; Bruine de Bruin & Bennett, 2020; Breakwell, Fino, & Jaspal, 2021; Champion & Skinner, 2008; Harper, Satchell, Fido, & Latzman, 2021; Jaspal, Fino, & Breakwell, 2020). We suppose that between the first and second year of pandemic the cost-benefit analysis of taking up the infection preventing actions, first in a form of preventive measures, then through vaccination, will not change substantially. Therefore the individual level of compliance with the recommendations of the health authorities regarding the infection prevention in one time point is likely to be predictive of person's COVID-19 vaccination probability in the next time point. We expect that high level of compliance in the past is associated with the high current level of compliance (H3).

Data and Methods

We used data from two SHARE Corona Surveys that collected data on individuals 50+ years old in 27 countries (throughout Europe and in Israel). In 2020 respondents reported their compliance with measures aimed at physical and social distancing (reducing frequency of shopping, walking, gatherings, family visits, wearing face mask and keeping distance in public) and hygiene (increasing frequency of washing hands, using disinfection fluids, covering cough and sneeze). In 2021 respondents were asked whether they have received a COVID-19 vaccine already. Those who replied negatively were in addition asked about their intention to get the vaccine. In the following analysis we merged those already vaccinated and those intending to be vaccinated and considered them as group likely to receive the vaccine.

Using latent class analysis we have distinguished between a group highly complying to all five types of preventive behaviors and a group with low compliance. Latent class membership and vaccination status were analyzed using logistic regressions. The main explanatory variable was the corresponding behavior of the partner, i.e. partner's compliance level in the regression of respondent's preventive behaviors and partner's vaccination status in the regression of respondent's vaccination status. The model of vaccination status included also respondent's compliance level in the previous period to capture how consistent are different health related behaviors over time. All regression models controlled for respondent's age and education

Preliminary results

H1

Table 1 presents the coefficients from the logistic regression of a person's level of compliance on his/her partner level of compliance. Both men and women are less likely to have a high level of compliance if the partner belongs to the low compliance category. Likewise, the probability of a person's high compliance is higher if his/her partner is highly compliant.

Table 1. Regression coefficients and t-statistics from logistic regression of compliance with preventive measures in 2020, separate models for men and women with two level structure (country and individual)

		Men n=16,046	Women n=21,914
Age		-0.014***	-0.030***
		(-3.36)	(-7.47)
Education	Ref.: primary or none	0.000	0.000
		(.)	(.)
	Secondary	0.240***	0.033
		(3.77)	(0.55)
	Tertiary	0.424***	0.185*
		(5.63)	(2.44)
Partner's compliance	Ref. no partner	0.000	0.000
		(.)	(.)
	partner - not compliant	-1.122***	-1.211***
		(-13.06)	(-16.80)
	partner, highly compliant	0.921***	0.787***
		(15.00)	(13.08)
	partner, compliance not known	0.429***	0.168
		(3.79)	(1.49)
	_cons	2.290***	4.291***
		(7.71)	(13.84)
	var(_cons[country_~)	0.150**	0.221**
		(2.98)	(3.17)

Similar dependency is observed with the 2021 data and a binary indicator of having been vaccinated (or intending to be) against COVID-19 as a response variable. Again, the presence of a non-vaccinated partner is associated with lower vaccination probability and the presence of vaccinated partner – with higher vaccination probability (Table 2).

Table 2. Regression coefficients and t-statistics from logistic regression of vaccination status in 2021, multilevel models (country and individual) separately for men and women

		Men n=16123	Women n=21865
Age		0.035***	0.032***
		(6.95)	(8.19)
Education	Ref.: primary or none	0.000	0.000
		(.)	(.)
	Secondary	0.331***	0.219***
		(4.34)	(3.86)
	Tertiary	0.615***	0.561***
		(6.56)	(7.69)
Partner's vaccination	Ref. no partner	0.000	0.000
		(.)	(.)
	partner, not vaccinated	-2.016***	-2.262***
		(-26.19)	(-32.31)
	partner, vaccinated	1.789***	1.582***
		(23.88)	(27.50)
	partner, vaccination not known	0.411**	0.383***
		(2.91)	(3.37)
_cons		-0.936*	-0.608
		(-2.34)	(-1.75)
var(_cons[country_~)		0.992***	1.151***
		(3.42)	(3.56)

H2

To test whether the effect of partner's compliance differs by sex we estimated model jointly for men and women allowing all coefficients to vary by sex (Table 3). However, as SHARE interviews both the respondent and his/her partner, such an approach results in having dependent units in a sample.[1] Therefore, apart from estimating the model on a full SHARE sample, we used also a restricted sample in which one person per household was kept. The interaction of coefficients for partner's compliance was not significant using both samples thus indicating that the effects of partner's behavior are similar for men and women.

In the same way we estimated logistic regression of having been vaccinated with the main covariate of interest being the vaccination status of the partner (Table 4). In this case the interaction of the covariate of interest by sex has appeared to be significant for one modality. Women whose partners were not vaccinated were even less likely to get the vaccine themselves, as compared to men with an unvaccinated partner. This result contradicts our expectation formulated in H2, because the effect of a male partner has appeared to be stronger than of a female partner, the opposite of what was predicted in H2.

[1] The preferred solution is to have three level model (country, household, person) and to allow for the interaction of sex with variance at the household level. This model could not be estimated duo to discontinuities.

Table 3. Regression coefficients and t-statistics from logistic regression of compliance to preventive behavior in 2020, multilevel models (country and individuals) jointly for men and women, fully interacted by sex.

		Full sample n=38320	Restricted sample n=26099
Sex (ref. men)	Women	1.998***	2.607***
		(4.91)	(5.44)
Age		-0.014***	-0.010*
		(-3.38)	(-2.10)
Women # Age		-0.017**	-0.026***
		(-2.98)	(-3.89)
Education	Ref.: primary or none	0.000	0.000
		(.)	(.)
	Secondary	0.254***	0.255***
		(4.13)	(3.44)
	Tertiary	0.429***	0.396***
		(5.82)	(4.54)
Women # Education	Ref.: primary or none	0.000	0.000
		(.)	(.)
	Secondary	-0.227**	-0.196*
		(-2.73)	(-1.98)
	Tertiary	-0.249*	-0.196
		(-2.44)	(-1.63)
Partner's compliance	Ref. no partner	0.000	0.000
		(.)	(.)
	partner - not compliant	-1.088***	-1.096***
		(-12.69)	(-10.50)
	partner, highly compliant	0.924***	0.929***
		(15.06)	(13.47)
	partner, compliance not known	0.401***	0.406***
		(3.56)	(3.59)
Women # Partner's compliance	Ref. no partner	0.000	0.000
		(.)	(.)
	partner - not compliant	-0.121	-0.044
		(-1.09)	(-0.32)
	partner, highly compliant	-0.137	-0.113
		(-1.61)	(-1.09)
	partner, compliance not known	-0.209	-0.242
		(-1.33)	(-1.54)
_cons		2.294***	2.075***
		(7.70)	(5.99)
var(_cons[country_~)		0.184***	0.190**
		(3.32)	(3.23)

Table 4. Regression coefficients and t-statistics from logistic regression of COVID-19 vaccination in 2021, multilevel models (country and individuals) jointly for men and women, fully interacted by sex

		Full sample n=37988	Restricted sample n=25313
Sex (ref. men)	Women	0.339	0.313
		(0.77)	(0.61)
Age		0.035***	0.036***
		(7.05)	(6.10)
Women # Age		-0.003	-0.003
		(-0.49)	(-0.36)
Education	Ref.: primary or none	0.000	0.000
		(.)	(.)
	Secondary	0.370***	0.420***
		(4.99)	(4.85)
	Tertiary	0.621***	0.670***
		(6.74)	(6.18)
Women # Education	Ref.: primary or none	0.000	0.000
		(.)	(.)
	Secondary	-0.143	-0.155
		(-1.58)	(-1.48)
	Tertiary	-0.053	-0.014
		(-0.46)	(-0.11)
Partner's vaccination	Ref. no partner	0.000	0.000
		(.)	(.)
	partner, not vaccinated	-1.990***	-1.927***
		(-25.97)	(-21.01)
	partner, vaccinated	1.781***	1.757***
		(23.79)	(19.87)
	partner, vaccination not known	0.405**	0.453**
		(2.90)	(3.12)
Women # Partner's vaccination	Ref. no partner	0.000	0.000
		(.)	(.)
	partner, not vaccinated	-0.270**	-0.396**
		(-2.62)	(-3.00)
	partner, vaccinated	-0.211*	-0.161
		(-2.25)	(-1.39)
	partner, vaccination not known	-0.037	-0.081
		(-0.21)	(-0.44)
_cons		-0.945*	-1.013*
		(-2.36)	(-2.20)
var(_cons[country_~)		1.106***	1.227***
		(3.62)	(3.58)

H3

We have looked how different preventive behaviors in two time points are linked on an individual level and on a couple level. The couples who were consistent in their choices of preventive behaviors in 2020 were also more likely to be consistent in their choices regarding COVID-19 vaccine in 2021 and their orientation towards health protection was more likely to remain unchanged (Table 5). That

is, the couples with both partners non-compliant were also the more likely, compared to other couples, to opt out unanimously from vaccination. Similarly, the couples with both partners complying with the recommended safety behaviors were also more likely to both get vaccinated, compared to other couples. There are no significant differences in their propensity to vaccination between couples with only one partner complying with the behavioral guidelines in 2020, regardless whether it was a man or a woman.

Table 5. Cross-tabulation of couple's compliance status in 2020 and couple's vaccination status in 2021, frequencies and row percentages (WN – woman No, WY – woman Yes, MN – man No, MY – man Yes)

		Vaccination				
		WN, MN	WN, MY	WY, MN	WY, MN	Total
Compliance	WN, MN	95	21	18	309	443
		21.44%	4.74%	4.06%	69.75%	100.00%
	WN, MY	82	44	16	458	600
		13.67%	7.33%	2.67%	76.33%	100.00%
	WY, MN	135	34	63	811	1,043
		12.94%	3.26%	6.04%	77.76%	100.00%
	WY, MY	1,221	451	317	10,275	12,264
		9.96%	3.68%	2.58%	83.78%	100.00%
	Total	1,533	550	414	11,853	14,350
		10.68%	3.83%	2.89%	82.60%	100.00%

On the individual level it also clear that persons who were more likely to apply preventive behaviors in 2020 were also more likely to get vaccinated in 2021 (Table 6).

Table 6. Regression coefficients and t-statistics from logistic regression of vaccination status on previous health behaviors, multilevel models for men and women separately

		Men	Women
Age		0.036***	0.035***
		(5.95)	(7.60)
Education	Ref.: primary or none	0.000	0.000
		(.)	(.)
	Secondary	0.310***	0.243***
		(3.38)	(3.65)
	Tertiary	0.598***	0.682***
		(5.27)	(7.87)
Partner's vaccination	Ref. no partner	0.000	0.000
		(.)	(.)
	partner, not vaccinated	-2.009***	-2.343***
		(-20.94)	(-23.82)
	partner, vaccinated	1.723***	1.615***
		(18.71)	(20.70)
	partner, vaccination not known	0.409**	0.355**
		(2.70)	(2.98)
Respondent's compliance in 2020	Ref. low	0.000	0.000
		(.)	(.)
	high	0.729***	0.559***
		(7.43)	(6.43)
_cons		-1.553**	-1.330**
		(-3.21)	(-3.25)
var(_cons[country_~)		1.153**	1.295***
		(3.28)	(3.44)

Summary and outlook

The results of the preliminary analysis were in line with H1 and H3 but did not confirm H2. The health behavior of couple is interdependent. If one partner is more compliant the other is more likely to be compliant as well- and vice-versa – a less compliant partner is more likely to be accompanied by a less compliant partner. This could be observed both for the personal safety measures applied during the first stage of pandemic and for the COVID-19 vaccination in 2021 (H1). These effects are not sex specific and there is no indication that the women's behavior influences men's behavior more than the other way around (H2). Finally, the individuals that were more likely to comply with guidelines regarding personal safety in 2020 were also more likely to get vaccinated against COVID-19 in 2021 (H3). These result, on the one hand, may indicate that an individual reluctance to follow authorities' guidelines due to some unobserved characteristics of a person may apply similarly to measures that differ in terms of individual and societal effort and impact. In case of an emergency situation, like in this and possible future pandemics, being able to identify and target this group of people may be a crucial for the overall efficacy of the public action. The other possible explanation is that those who had not been convinced to follow the guidelines on the "soft" measures of infection prevention, like hand washing, covering cough and sneeze, face masks, societal distance, were also not utilizing the ultimate measure of vaccination against the disease. It may indicate that those failed to be taken onboard of the public action in the initial stage may be lost to the cause more easily. The negligence

of the public institutions at the initial stage may have long lasting consequences. With the present analyses we were not able to distinguish between the first – individual level, and the second – contextual explanation, but both of them are important for our ability to react to possible future health threats.

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