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Examining Factors Associated with the Use of Face Coverings during COVID-19: A Survey of Shoppers in Greater Grand Forks, Minnesota and North Dakota

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EXAMINING FACTORS ASSOCIATED WITH THE USE OF FACE COVERINGS DURING COVID-19

[]

A Survey of Shoppers in Greater Grand Forks, Minnesota and North Dakota Examining Factors Associated with the Use of Face Coverings during COVID-19: A Survey of Shoppers in Greater Grand Forks, Minnesota and North Dakota

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The views expressed in this report are those of the authors based on their study and do not purport to reflect the official policy or position of the University of North Dakota, the Grand Forks City Council, Hugo's Family Marketplace, and Grand Forks Public Health.

Abstract

Despite the availability of COVID-19 vaccines, the pandemic's persistence and recent spikes in cases have heightened the need for the promotion of protective behaviors notably, the continued use of face coverings (or 'masks' in the common parlance for COVID-related face coverings). Effective messaging on mask use is essential to more fully resonate with individuals and their shared communities. Studies covering rural or mostly-urban regions in the U.S. are sparse. Accordingly, an interdisciplinary team of social work and public health researchers explored mask wearing behaviors in a small, urban metro community consisting of two cities spanning North Dakota and Minnesota that serves a mostly rural region. Chi-square tests for independence revealed nuanced gender and age-based differences in face covering usage. Significant factors in mask usage included satisfaction with available information and related public education efforts, and approval from people perceived to be important. Findings suggest the value of utilizing parasocial interactions to promote protective behaviors such as face covering use. This paper discusses additional implications.

Keywords: COVID-19, Face Coverings, Greater Grand Forks,, North Dakota, Minnesota, Rural, Non-urban, Health Promotion

Introduction

The use of face coverings—this paper will alternatively refer to 'masks', the term used synonymously in general parlance--was a highly recommended measure for protection and curbing the spread of the COVID-19 pandemic amid the uncertainties of potential treatments and the effort to promote use of COVID-19 vaccines (Haischer et al., 2020). Earlier, with the nascent nature of studies on face coverings and COVID-19, there was limited evidence and inconclusive results about their effectiveness, which resulted in ambiguous messaging from health officials. Nonetheless, experts quickly moved toward consensus regarding the benefits of consistent mask use in reducing the likelihood of infection (Heald et al., 2021; Qaseem et al., 2020).

Despite the availability of COVID-19 vaccines, the pandemic's persistence and subsequent spikes in cases heightened the need for the promotion of protective behaviors, including continued use of face coverings. The emphasis on face coverings is supported by emerging evidence, both nationally (i.e., in the United States) and internationally, indicating that face covering usage is associated with considerable reductions in the incidence and spread of COVID-19 (Centers for Disease Control and Prevention, CDC, 2021).

Effective messaging on mask use more fully resonates with individuals and their shared communities, and leads to greater mask usage and reduced transmission of the virus. Communities vary geographically, demographically, and in relation to their sociocultural makeup (Parvanta et al., 2017). Therefore, it is imperative to develop context-specific understandings of the dynamics and patterns of face covering usage. However, there is a dearth of studies covering small urban, or rural regions in the U.S. (Dasgupta et al., 2020). This study examines factors associated with face covering use in a small urban community, serving a largely rural region.

Methods

Procedures. An interdisciplinary team of social work and public health researchers conducted a survey ($N = 1,444^{1}$) on face covering usage. The survey utilized convenience sampling and targeted customers in five branches of a grocery supermarket in Greater Grand Forks, a small, urban metro community which comprises the twin cities of Grand Forks, North Dakota and East Grand Forks, Minnesota and serves a mostly rural region. The survey was set up through Qualtrics. The prospective participants received quarter-sized flyers with survey information during check-out after shopping, and accessed the survey through a URL or QR code. The URL and QR code were also posted on the grocery supermarket's social media platform. The survey was approved by the Institutional Review Board of the researchers' institution.

Measures. Demographic questions covered gender, age, education, household income, etc. In addition, questions were asked about face covering usage in public settings and measured on a four-point Likert-type scale (never to always). Satisfaction with education/information on face covering usage was also measured on a five-point Likert-type scale (very dissatisfied to very satisfied). Finally, the team assessed the approval of face covering usage by individuals the respondents perceived to be important to them (e.g. parents, partner, friends, community leaders, etc.) measured on a five-point Likert-type scale (strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, and strongly agree). For analytical purposes, the response options were conflated. As an example, the response options for satisfaction with education/information became neither satisfied nor dissatisfied, dissatisfied and satisfied.

¹ The sample size for each analysis varied slightly based on the valid responses for the variables examined.

Analyses. The analyses were performed using IBM SPSS Statistics 26 (SPSS version 26).

Descriptive statistics covering the examination of the frequencies of the respondents'

demographics were first examined. Further, chi-square tests for independence were conducted to

examine the following:

- 1. The association between face covering usage and gender.
- 2. The association between face covering usage and age.
- 3. The association between face covering usage and approval from people participants perceived to be important.
- 4. The association between face covering usage and level of satisfaction with information/education on face coverings.

Results

The participants were largely female (82.9%), and the ages ranged from 18 to 85 years.

The mean age was 43.9 years (SD = 13.9). Most of the participants were white (90.5%) (Table

1). Three broad categories of face covering usage were identified - Never (i.e. respondents who

Never use face coverings), Sometimes (i.e. respondents who Sometimes use face coverings), and

Most often to Always (i.e. respondents who use face coverings Most often to Always).

Demographic	Ν	Mean (SD)
Age, years	1372	43.9 (13.9)
	Ν	Percent
Gender		
Male	216	15.7
Female	1156	84.3
Missing	72	
Race/Ethnicity		
White	1253	90.5
Black or African American	2	0.1
American Indian or Alaska Native	14	1
Asian	7	0.5
Other	23	1.7
Prefer not to answer	66	4.8
Hispanic	19	1.4
Missing	60	

IABLE I: Respondents' Demographic	TABLE	1:	Respondents'	Demographic
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126	9.1
261	18.9
662	47.8
335	24.2
60	
53	4
117	8.9
155	11.8
271	20.7
270	20.6
445	33.9
133	
	126 261 662 335 60 53 117 155 271 270 445 133

Face Covering Usage and Gender

A significant association between gender and face covering usage was observed $[X^2 (2) = 35.05, p \le 0.001]$. The proportion of males who never wear face coverings (29.2%) was higher than expected (16.5%). The proportion of females who never wear face coverings was 14.1% which was lower than expected (16.4%). The findings also show that approximately 48% of the males wear face coverings most often – always compared to 65.5% of females. The graph below provides an overview of the responses. (see Table 2 in the Appendix for the full stats).



Face Covering Usage and Age

Five age categories were identified comprising: 18-29 years (13.7% of the sample), 30-40 years (34.3% of the sample), 41-50 years (21.7% of the sample), 51-60 years (14.8% of the sample), and 61+ years (15.5% of the sample). A significant association was observed between age group and face covering usage, $[X^2(8) = 75.71, p \le 0.001]$. Most of the respondents in the 61+ years category (86.3%) wear face coverings most often – always. This proportion was higher than expected (62.5%). The proportion of respondents in the 61+ years category who never wear face coverings was 4.2% which was lower than expected (16.7%). For the proportion of respondents who never wear face coverings in the 30-40 years (19.1%) and 41-50 years (23.8%) age categories was higher than expected (16.7% for both groups). Conversely, the proportion that wear face coverings most often – always for both age groups were less than expected. Specifically, the proportions were 53.4% of the 41-50 years respondents and 56.1% of the 30-40 years respondents with the corresponding expected proportions being 62.4% for both groups.

The proportion of respondents in the 18-29 years group who never wear face coverings (16.5%) and who wear them most often-always (61.7%) were approximately the same as expected. The graph below provides an overview of the responses. (see Table 3 in the Appendix for the full stats).





Face Covering Usage and Approval from People Perceived to be Important

The relationship between use of face coverings and approval of face covering wearing by individuals the respondents perceived to be important to them (e.g. parents, partner, friends, community leaders, etc.) was examined. Approval was cast in three frames – agree, disagree, and neither agree nor disagree. A significant association was observed between approval from people perceived to be important and face covering usage, X^2 (4) = 423.81, p ≤ 0.001. For respondents who indicated that people they considered important to them approved of face covering wearing, 83.6% wear them most often-always. This proportion was higher than expected (61.8%). Additionally, the proportion that never wear face covering was 2.9% which was lower than

expected (17.1%). Approximately 37% of the participants who indicated that people they considered important to them disapproved of face covering use never wear them. This proportion was higher than expected (17.1%). Approximately 40% of these participants wear face coverings most often-always which was lower than expected (61.8%). The graph below provides an overview of the responses. (see Table 4 in the Appendix for the full stats).



Fig. 3

Face Covering Usage and Level of Satisfaction with Information/Education

Three groups of face covering use were identified: those who never wear or use them, those who wear or use them sometimes, and those who wear or use them most often – always. A significant association was observed between the level of satisfaction with information/education on the wearing of face coverings and face covering usage, X^2 (4) = 145.10, p ≤ 0.001. Of the respondents who never use face coverings, majority (51.9%) were dissatisfied with information/education on face coverings. This proportion was higher than expected (36.9%). Also, 33.6% of the respondents who never use face coverings were neither satisfied nor dissatisfied with information/education on face coverings which was also higher than expected (21.4%). Meanwhile, 14.5% were satisfied with information/education on face coverings (which was lower than the expected (41.5%). Conversely, of the respondents who wear face coverings most often-always, majority (53.2%) were satisfied with the information/education on face coverings which was higher than expected (41.5%) while 31.3% were dissatisfied which was lower than expected (36.9%). The proportion that was neither satisfied nor dissatisfied was 15.4% which was also lower than expected (21.4%).

Additionally, of the respondents who wear or use face coverings sometimes, a higher percentage (41.6%) were dissatisfied with information/education which was higher than expected (36.9%). The graph below provides an overview of the responses. (see Table 5 in the Appendix for the full stats).



Discussion

The study examined the use of face coverings in Greater Grand Forks, a small, urban metro region spanning North Dakota and Minnesota that serves a mostly rural region. Similar to the observations by other researchers, the results of the current study suggest that females wear face coverings more often compared to males (Capraro and Barcelo, 2020; Haischer et al., 2020). The findings are also consistent with other studies that show that face coverings and mask use tends to be age-dependent. Notably, older adults (60 years and over) use face coverings more compared to young and middle-aged persons (Haischer et al., 2020; Knotek II et al., 2020). However, the findings of the current study also show that the association between age and face covering use may be more nuanced than often assumed. Older respondents aged 61 years and over were markedly more likely to use face coverings, followed by those between the ages of 51-60 years, and younger respondents between the ages of 18-29. In comparison, respondents between the ages of 30 - 40, and 41–50 were less likely to use face coverings.

Further, the results suggest there is a relationship between the levels of satisfaction with the volume and quality of available information and public education on face coverings, and their actual use. Specifically, respondents who were satisfied with available information and the related public education on face coverings were significantly more likely to use them. This suggests that simply assuming general knowledge or information about such matters may not be adequate to influence behaviors. The information must be tailored and resonate with the socio-cultural and political dynamics of the individual's environment. Moreover, the information must demonstrate personal relevance to the individual (Arlinghaus and Johnston, 2018; Schiavo, 2014). Consistent with previous studies (Brown and Basil, 2010; Van Rossem and Meekers, 2011), individuals within a person's social circles and others who are perceived to be important, regardless of whether there are close or direct relations, have an impact on people's behaviors including health-related decisions.

The findings strengthen the need to increase information and education about face coverings to reduce the spread of COVID-19, particularly, delivering them in ways that resonate

with people (Dasgupta et al, 2020). The findings also suggest that people's close family and social networks can be utilized in providing the needed support that encourages positive behaviors. Further, parasocial interactions, which encompass the sense of connection and appeal that develop between public figures and individuals, can be leveraged in driving home the message about protective behaviors such as face covering (Brown and Basil, 2010). Leaders and other community icons should be engaged in helping convey the messages about face covering use and other protective behaviors. Approval from such persons creates positive psychological and socio-emotional conditions which make people feel supported and which may also bolster the needed confidence to use face coverings. This is very essential considering the polarization of ideas and theories around face coverings and their use (Brown and Basil, 2010; Van Rossem and Meekers, 2011).

Conclusion

This study has a number of limitations. First, since we utilized a nonrandom sample, caution should be exercised regarding the generalizability of the findings. Second, this study does not analyze the unique and relevant regional and cultural variables that could better explain the influence of 'important' people. Again, we did not explore the variations between the two cities or states (i.e. Grand Forks, ND, and East Grand Forks, MN). Nonetheless, these findings have important implications as demonstrated above and provide valuable insights on the dynamics of non-urban areas. Additionally, these findings show that in curating messages for health promotion, it is important to avoid overgeneralizations about face covering use especially in regard to age-groups. The findings also show that proximal and distal social connections can serve as capital in increasing support for the use of face coverings.

Finally, with the continued incidence of COVID-19 and the emergence of new variants, the hesitancy displayed by segments of the population in getting the vaccinated despite the

availability of vaccines (Thunstrom et al., 2020), highlights the need for diverse measures in reducing transmission and enhancing public safety. In this regard, the use of face coverings is still important, and research-informed actions remain a priority. Therefore, there is a need for further examination of face covering use and its related nuances to support public health efforts especially in the area of health promotion.

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			Wearing Face coverings in Public Settings			
			Never	Sometimes	Most Often to Always	Total $(N = 1372)$
Gender	Male	Count	63	50	103	216
			(29.2%)	(23.1%)	(47.7%)	(15.7%)
		Expected	35.6	44.9	135.6	
		Count	(16.5)	(20.7%)	(62.7%)	
	Female	Count	163	235	758	1156
			(14.1%)	(20.3%)	(65.6%)	(84.3%)
		Expected	190.4	240.1	725.4	
		Count	(16.5)	(20.7%)	(62.7%)	

APPENDIX

TABLE 2: Face Covering Usage and Gender

TABLE 3: Face Covering Usage and Age

	Wearing Face coverings in Public Settings					
Age Categorie	S	Novor	Comotimos	Most Often	Total (N =	
		Inever	Sometimes	to Always	1372)	
18-29 Years	Count	31	41	116	188	
		(16.5%)	(21.8%)	(61.7%)	(13.7%)	
	Expected Count	31.5	39.1	117.4		
		(16.7%)	(20.7%)	(62.4%)		
30-40 Years	Count	90	117	264	471	
		(19.1%)	(24.8%)	(56.1%)	(34.3%)	
	Expected Count	79.0	97.8	294.2		
		(16.7%)	(20.7%)	(62.4%)		
41-50 Years	Count	71	68	159	298	
		(23.8%)	(22.8%)	(53.4%)	(21.7%)	
	Expected Count	50.0	61.9	186.1		
		(16.7%)	(20.7%)	(62.4%)		
51-60 Years	Count	29	39	135	203	
		(14.3%)	(19.2%)	(66.5%)	(14.8%)	
	Expected Count	34.0	42.2	126.8		
		(16.7%)	(20.7%)	(62.5%)		
61+ Years	Count	9	20	183	212	
		(4.2%)	(9.4%)	(86.3%)	(15.5%)	
	Expected Count	35.5	44	132.4		
	-	(16.7%)	(20.7%)	(62.5%)		

	_	Wearing Fa			
Approval of Face coverings by				Most Often to	Total
People Important to Respondent		Never	Sometimes	Always	(N = 1428)
		65	96	58	219
	Count	(29.7%)	(43.8%)	(26.5%)	(15.3%)
Neither agree	Expected	37.4	46.2	135.4	
nor disagree	Count	(17.1%)	(21.1%)	(61.8%)	
		156	99	168	423
	Count	(36.9%)	(23.4%)	(39.7%)	(29.6%)
	Expected	72.3	89.2	261.6	
Disagree	Count	(17.1%)	(21.1%)	(61.8%)	
		23	106	657	786
	Count	(2.9%)	(13.5%)	(83.6%)	(55.0%)
	Expected	134.3		486.0	
Agree	Count	(17.1%)	165.7 (21.1%)	(61.8%)	

TABLE 4: Face Covering Usage and Approval from People Perceived to be Important

TABLE 5: Face Covering Usage and Level of Satisfaction with Information/Education

			Wearing Face coverings in Public Settings			
			Never	Sometimes	Most	Total (N =
					Often to	1396)
					Always	
Level of Satisfaction	Neither	Count	79 (33.6%)	87	134	
with	satisfied			(29.7%)	(15.4%)	300
Information/Education	nor					(21.5%)
	dissatisfied	Expected	50.5 (21.4%)	63	186.5	
		Count	· · · · ·	(21.5%)	(21.4%)	
	Dissatisfied	Count	122 (51 9%)	122	272	
	Dissuistica	count	122 (31.970)	(41.6%)	(31.3%)	516 (37%)
		Expected	86.9 (36.9%)	108.3	320.8	010 (0770)
		Count		(36.9%)	(36.9)	
		e o univ			(000)	
	Satisfied	Count	34 (14.5%)	84	462	580
				(28.7%)	(53.2%)	(41.5%)
					(/*/	
		Expected	97.6 (41.5%)	121.7	360.6	
		Count		(41.5%)	(41.5%)	