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Brief Report

A cross-sectional analysis of trust of information and COVID-19 preventative practices among people with disabilities

Catherine Ipsen, Andrew Myers*, Rayna Sage

University of Montana, Rural Institute for Inclusive Communities, Missoula, MT, 59812, USA

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Background: Trust of information shapes adherence to recommended practices and speed of public compliance during public health crises. This is particularly important for groups with higher rates of high-risk health conditions, including those aged 65 and over and people with disabilities.
Objective: We examined trust in information sources and associated adherence to COVID-19 public health recommendations among people with disabilities living in metropolitan, micropolitan, and noncore counties.
Methods: We recruited participants using Amazon's Mechanical Turk (MTurk) and screened for disability status (n = 408). We compared sociodemographic groups with t-tests, Pearson's correlations, and Chi-square, as appropriate. We used linear regression to examine factors associated with trust in information and compliance with CDC recommended COVID-19 practices.
Results: Nonmetro respondents had the lowest trust ratings among all demographic groups, and reported significantly less trust in most information sources. Respondents aged 65 and over reported the highest compliance with CDC recommended practices, while those from nonmetro areas reported the lowest. A regression model for adherence to CDC recommended practices was significant ($F = 11.87$, $P \leq .001$), and explained 33% of the variance. Specifically, increased adherence was associated with being over 65, female, and higher general trust scores. Decreased practices were associated with being nonwhite, nonmetro, higher trust scores in President Trump, and having a communication disability.
Conclusions: Trust in information sources is associated with action. It is important to provide clear, consistent, and non-polarizing messages during public health emergencies to promote widespread community action.
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Introduction

Public health relies on individuals collectively adopting and committing to prevention practices. This is particularly important when facing public health crises such as COVID-19, where rapid community action is required to mitigate loss.[1] Public trust of information shapes both adherence to recommended practices and speed of public compliance.[1–3] For instance, trust in federal health agencies was associated with higher vaccination rates during the H1N1 pandemic.[3,4]

Health risks related to COVID-19 are not distributed evenly. People with disabilities (PwDs) are at higher risk of COVID-19 complications because they are usually older (65+), more likely to live in nursing homes and long-term care facilities, and often have underlying chronic health conditions.[5,6] This is compounded for rural residents because they are more likely to experience disability earlier in life,[7] must travel further to specialty and emergency care; experience higher rates of chronic health conditions including obesity, heart disease, diabetes, and chronic respiratory disease, and higher rates of poverty relative to urban.[7–10] It is critical for PwDs to receive, understand, and trust public health information and adopt public health recommendations,[11] especially rural PwDs.

Trust in public health information varies across demographic groups.[3] Generally, women are more trusting than men,[2] and older people are more trusting than younger people.[3] Trust ratings are highest for local medical providers, but lower among those who have experienced health discrimination, including PwDs, certain racial and ethnic groups, and people living in poverty.[3,12]

* Corresponding author. University of Montana Rural Institute, Missoula, MT, 59812, USA.
E-mail address: Andrew.myers@mso.umt.edu (A. Myers).

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Trust erodes when information is inconsistent or polarizing.[1,3] Inconsistent messaging can be particularly problematic early in health crises because best practices shift as new information is incorporated into recommendations.[3] As recommendations change, messaging can become increasingly inconsistent because new findings are incorporated at different rates among information sources.[13]

For many, the presentation of public health information is too complex due to lower rates of health literacy, which is reportedly lower among rural populations and some types of disabilities.[13] This paper examines trust in information sources and associated adherence to COVID-19 public health recommendations among PwDs across geography. Better understanding of the components of trust will help public health officials more effectively tailor health messages to reach high risk groups, including rural PwDs.

Methods

We recruited 408 PwDs using Amazon's Mechanical Turk (MTurk), an online marketplace, where requesters post "Human Intelligence Tasks" (HITs) that workers complete for payment. For survey research, HITs often begin with screening questions to select a target group. Individuals who meet screening criteria are invited to participate in a longer survey.[14]

We sampled from 4930 MTurk workers in the United States (U.S.) and screened 408 PwDs aged 18+ into the study. We used two disability screening questions from the National Survey on Health and Disability (NSHD) to identify PwDs.[15] Approximately 95% of respondents answered yes to the question "Are you limited in any way in any activities because of a physical, mental or emotional problem?" and 26% answered yes to the question "Do you now have any health problem that requires you to use special equipment, such as a cane, a wheelchair, a special bed, or a special telephone?" We utilized an additional question to oversample rural respondents (county with an urban core less than 50,000 residents[16]) in 4 of the 7 waves of data collection.

We paid $.25 to respondents who took the 12-question screening survey, and invited respondents who met screening criteria to take the COVID-19 survey and receive a $3.00 bonus. All data was collected between April 23, 2020 to May 10, 2020. This timeframe coincided with rapidly evolving COVID-19 recommendations, fell approximately 1–2 months after widespread community restrictions, and prior to most state-wide phased re-openings.

We used data quality strategies outlined by MTurk researchers including use of MTurk approval ratings, cognitive checks, and hidden screening criteria to reduce false reporting.[17–19] Only workers with an MTurk approval rating of 95% or higher could access our screening survey. We included two cognitive questions to screen out computer bots, and included screening questions about smoking, alcohol consumption, use of public transportation, international travel, and visits to national parks to obscure our target population and prevent response bias.

Past research indicates MTurk workers are younger, more educated, less racially diverse, more liberal, and from lower income brackets than the general population.[19–22] MTurk workers, however, are reported to be more racially diverse than other online samples[17,23] and provide better quality data than professional online or marketing research panels.[24–26] MTurk is an important recruitment strategy for hard-to-reach populations including those with disabilities[27,28] and has been utilized in multiple disability-focused efforts.[17,29] Researchers using MTurk to conduct surveys with PwDs report higher rates of individuals with psychological disability, relative to those with physical disability.[30,31]

Measures

Demographics. The survey included questions about age, gender, race/ethnicity, education, employment status, and income. Income was categorized into $10,000 increments and treated as a continuous variable with 1 = $10,000 or less and 11 = greater than $100,000.

Rural and Urban Classifications. Responses were matched to Federal Informational Processing Standards codes to classify counties into metropolitan (contain urban core of 50,000 or more), micropolitan (contain urban core of 10,000–49,999) and noncore counties (contain urban core of less than 10,000) using the Office of Management and Budget classification scheme.[16]

Disability. We included the Washington Group short set (WGSS), which assesses functioning on a 4 point Likert-type scale from "no difficulty" to "cannot do at all" for (1) seeing, even if wearing glasses, (2) hearing, even if using a hearing aid, (3) remembering or concentrating, (4) walking or climbing stairs, (5) self-care, such as washing all over or dressing, and (6) communicating, for example understanding or being understood by others.[32] These measures were analyzed dichotomously; all respondents who reported at least some difficulty were considered as having a disability.

Health Status. We used the question "In general, would you say your health is …" (1 = poor; 5 = excellent), from the Behavioral Risk Factor Surveillance System HRQoL-4 module to assess overall health.[33]

COVID Practices. Respondents indicated with a yes or no response if they had taken any of six Centers for Disease Control and Prevention (CDC) recommended prevention practices for COVID-19 in the last 30 days: washing or sanitizing hands, avoiding public or crowded spaces, social distancing, wearing a mask, avoiding contact with high risk people, and monitoring temperature.

Trust in Information. Respondents rated their level of trust in various information sources about COVID-19 on a 5-point Likert-type scale from 1 = total distrust to 5 = total trust. Information source categories were based on literature about trust in public health recommendations from (1) personal contacts (e.g. family, friends, neighbors), (2) service providers (e.g. physicians, case managers), (3) local news; (4) national news, (5) local/county/state agencies (e.g. county health departments) (6) federal agencies (e.g. CDC),[1,2] and (7) highly visible spokespeople, including Dr. Anthony Fauci, head of the National Institute of Allergy and Infectious Diseases, and President Trump.[3]

Past studies have evaluated trust based on delivery modes (i.e. television, internet, social media) or for very specific news sources (i.e FOX, MSNBC).[1,2,13,34] We focus on general information sources rather delivery mode because information (i.e. local news) can be disseminated though various medias (i.e. radio, television).

Data analyses

We imported data into IBM SPSS Statistics v. 25 for analyses. Results were considered statistically significant at $p \leq .05$. We compared continuous variables with t-tests, ANOVAs, and Pearson's correlations, and categorical variables using Chi-square tests with Bonferroni corrections for post-hoc tests. We computed eta-squared and Phi to estimate effect sizes and noted moderate to large effects in tables. We used linear regression to examine factors associated with compliance with CDC recommended COVID-19 practices.

Table 1
WGSS disability type by metro, micro, and noncore counties.

	Metro %	Micro %	Noncore %	*p*
Vision: difficulty seeing, even if wearing glasses (n = 140)	35.4[a]	25.6[a]	35.4[a]	.474
Hearing: difficulty hearing, even if using a hearing aid (n = 85)	17.9[a]	20.5[a,b]	41.7[b]	.001***
Mobility: difficulty walking or climbing stairs (n = 176)	39.3[a]	61.5[b]	57.4[a,b]	.004**
Cognitive: difficulty remembering or concentrating (n = 226)	55.2[a]	61.5[a]	54.2[a]	.733
Selfcare: Difficulty with self-care, such as washing all over or dressing (n = 111)	25.7[a]	30.8[a]	35.4[a]	.327
Communication: Difficulty communicating, for example understanding or being understood by others (n = 90)	18.8[a]	30.8[a,b]	37.5[b]	.006**
No WGSS items endorsed (n = 83)	21.9[a]	12.8[a]	16.7[a]	.324

*$p \le .05$, **$p \le .01$, ***$p \le .001$. Bolded indicates medium effect size; bolded italics indicates large effect size.
[a,b] Different letters indicate post-hoc values significantly differ at $P = .05$ with Bonferroni adjustment.
WGSS disability items are not mutually exclusive, individuals could endorse more than one disability type.

Results

Sample

We collected 408 responses from 49 U S. states in metropolitan (79%), micropolitan (10%), and noncore (12%) counties. Participants were predominantly women (57%), white non-Hispanic (74%), and aged 18–34 (47%), 35–64 (47%), and 65 and older (6%). The sample had a high school degree or less (12%), some college or technical schooling (23%), associate's or technical degree (12%), and bachelor's degree or higher (54%). Respondents were employed full-time (41%), part-time (17%), laid-off due to COVID (14%) and not employed (27%).

Overall, respondents reported different types of disabilities at different rates: vision (35%), hearing (21%), mobility (44%), cognitive (56%), self-care (27%), and communication (22%). Approximately 21% of respondents did not endorse any WGSS items after answering yes to initial disability screening questions. We retained respondents who did not endorse any WGSS items because past research has found that measures of functional disability undercount certain disability types including mental disabilities,[35] which are over-represented in MTurk disability samples.[36–39] Table 1 compares disability rates across metro, micro, and noncore counties. In general, rural respondents (i.e. micro and noncore counties) reported higher rates of disability than urban counties (i.e. metro), especially for hearing, mobility, and communication difficulties.

Trust in Information

We calculated a mean aggregate trust score for general information sources. We excluded trust ratings for Dr. Anthony Fauci and President Trump because they frequently provided different viewpoints about the severity of the pandemic and national

Table 2
Mean trust ratings for general information sources (n = 408).

	Personal Contacts	Service Providers	Local News	National News	Local, County, State Agencies	Federal Agencies	Dr. Fauci	President Trump	Mean Trust [1]
Total	3.50	3.99	3.31	3.20	3.63	3.66	3.76	2.27	3.56
Age Group	$p = .285$	$p = .039$*	$p = .082$	$p = .573$	$p = .093$	$p = .258$	$p = .063$	$p = .138$	$p = .05$*
18-34 (47%)	3.43	3.91	3.21	3.14	3.53	3.69	3.62	2.18	3.49[a]
35-64 (47%)	3.54	4.03	3.37	3.25	3.69	3.59	3.84	2.30	3.58[a,b]
65+ (6%)	3.71	4.43	3.67	3.33	3.96	4.00	4.13	2.78	3.86[b]
Gender	*PP* = .181	$p = .005$**	$p = .201$	$p = .954$	$p = .212$	$p = .800$	$p = .796$	$p = .007$**	$p = .193$
Women (57%)	3.56	4.12	3.37	3.21	3.69	3.67	3.74	2.10	3.60
Men (43%)	3.42	3.85	3.23	3.20	3.55	3.64	3.77	2.50	3.50
Race	$p = .954$	$p = .005$**	$p = .744$	$p = .353$	$p = .343$	$p = .684$	$p = .166$	$p = .094$	$p = .258$
White, non-Hispanic (74%)	3.50	4.08	3.32	3.17	3.66	3.68	3.81	2.20	3.58
Non-white (26%)	3.50	3.77	3.28	3.29	3.55	3.62	3.61	2.48	3.49
Education	$p = .246$	$p = .370$	$p = .066$	$p \le .001$***	$p = .464$	$p = .959$	$p = .465$	$p = .020$*	$p = .175$
HS, GED or less (12%)	3.28	3.98	3.07	2.87[a]	3.46	3.62	3.56	1.90	3.40
Some College or Assoc/Tech Degree (34%)	3.54	4.09	3.23	2.96[a]	3.63	3.66	3.74	2.11	3.53
BA+ (54%)	3.53	3.94	3.42	3.42[b]	3.67	3.67	3.81	2.44	3.61
Geography	$p = .137$	**$p \le .001$***	$p = .010$**	$p = .057$	$p \le .001$***	$p = .008$**	$p = .025$*	$p = .111$	**$p \le .001$***
Metro (79%)	3.54	4.11[a]	3.37[a]	3.27	3.73[a]	3.74[a]	3.85[a]	2.19	3.63[a]
Micro (10%)	3.50	4.13[a]	3.31[a,b]	3.00	3.47[a,b]	3.68[a,b]	3.54[a]	2.47	3.52[a]
Noncore (12%)	3.23	3.19[b]	2.87[b]	2.90	3.08[b]	3.17[b]	3.38[b]	2.61	3.08[b]
WGSS Disability [2]									
Vision (35%)	3.42	3.80**	3.26	3.12	3.51	3.50**	3.55**	2.54**	3.47
Hearing (21%)	3.40	3.59***	3.22	3.15	3.29**	3.40*	3.58	2.71**	3.38*
Mobility (44%)	3.51	3.97	3.37	3.30	3.67	3.64	3.82	2.55***	3.58
Cognitive (56%)	3.45	3.99	3.26	3.15	3.62	3.56	3.63*	2.29	3.51
Selfcare (27%)	3.46	3.74**	3.28	3.26	3.51	3.51	3.59	2.69***	3.47
Communication (22%)	3.45	3.63***	3.20	3.22	3.32**	3.31**	3.57**	2.73	3.39*
No items endorsed (21%)	3.54	4.00	3.33	3.32	3.72	3.83	3.88	2.01	3.63

*$p \le .05$, **$p \le .01$, ***$p \le .00$. Bolded indicates medium effect size; bolded italics indicates large effect size.
[a,b] Different letters indicate post-hoc values significantly differ at $P = .05$ with Bonferroni adjustment.
[1] Mean trust score excludes trust scores for Dr. Fauci and President Trump.
[2] Groups are not mutually exclusive, individuals could endorse more than one disability type. Significant differences are relative to those without the condition.

Table 3
Mean number of CDC COVID-19 recommended practices.

Groups	Mean Number
Total	3.56
Age Group	$p = .01$**
18-34 (47%)	3.81[a]
35-64 (47%)	4.14[a,b]
65+ (6%)	4.88[b]
Gender	$p \leq .001$***
Women (57%)	4.34
Men (43%)	3.60
Race	$p \leq .001$***
White, non-Hispanic (74%)	4.25
Non-white (26%)	3.40
Education	$p = .006$**
HS, GED or less (11.5%)	4.40[a]
Some College or Assoc/Tech Degree (34%)	4.31[a]
BA+ (54%)	3.77[b]
Geography	**$p \leq .001$***
Metro (79%)	4.24[a]
Micro (10%)	3.95[a]
Noncore (12%)	2.79[b]
Health	$p = .037$*
Poor or Fair Health (35%)	4.33[a]
Good (39%)	3.81[b]
Very Good or Excellent (26%)	4.00[b]
WGSS Disability [1]	
Vision (35%)	3.47***
Hearing (21%)	**2.85****
Mobility (44%)	3.75**
Cognitive (56%)	3.95
Selfcare (27%)	**3.25****
Communication (22%)	***2.75*****
No items endorsed (21%)	4.05

*p ≤ .05, **p ≤ .01, ***p ≤ .00. Bolded indicates medium effect size; bolded italics indicates large effect size.
a,b Different letters indicate post-hoc values significantly differ at P = .05 with Bonferroni adjustment.
[1] Groups are not mutually exclusive, individuals could endorse more than one disability type. Significant differences are relative to those without the condition.

readiness to address the crisis.[40] Trust in Dr. Fauci was strongly correlated with mean trust ratings across other sources of information ($r = 0.571$, $p \leq .001$), while trust in President Trump was not correlated ($r = 0.071$, $p = .183$) and may have captured a different dimension, such as political or ideological leaning.

Table 2 shows mean trust of various information sources for different sociodemographic groups. Overall, respondents trusted service providers the most. This was true for all subgroups except those living in noncore counties, who trusted Dr. Fauci at higher rates. President Trump consistently received the lowest trust ratings. Noncore respondents had the lowest trust ratings among all demographic groups. Individuals with hearing and communication disabilities reported significantly lower mean trust ratings than those without these disabilities.

Income level was positively correlated with trust in service providers ($r = .163$, $P = .001$), federal agencies ($r = 0.131$, $P = .009$), and Dr. Fauci ($r = 0.117$, $P = .023$), but effect sizes were small.

COVID-19 practices

Rates of compliance with CDC recommended practices included handwashing and sanitizing (81%), social distancing (76%), avoiding public or crowded spaces (81%), avoiding contact with high-risk people (64%), (5) wearing a mask (73%), and (6) taking your temperature (27%). Table 3 compares the mean count of practices for sociodemographic groups and three categories of general health: poor or fair, good, and very good or excellent. Respondents aged 65+ reported the highest compliance with recommended practices, along with women, white non-Hispanics, individuals with less education, individuals with poor health, and those living in more urban areas. Subgroups with the lowest compliance included younger individuals, men, non-whites, people with hearing and communication disabilities, and respondents from nonmetro areas.

Trust and practices

Mean trust scores were positively correlated with the mean count of recommended COVID practices ($r = 0.234$, $P \leq .001$). Table 4 includes coefficients for a linear regression defined as number of practices = f (age $65+_d$, $woman_d$, $nonwhite_d$, college $degree_d$, $nonmetro_d$, poor or fair $health_d$, mean aggregate trust, Trump trust, vision $_d$, hearing $_d$, mobility $_d$, cognitive $_d$, selfcare $_d$, and communication $_d$ disabilities). Model variables did not exceed correlation thresholds of > .7, which would indicate multicollinearity. The model was significant ($F = 11.87$, $P \leq .001$), and explained approximately 33% of the variance in the count of CDC recommended practices. Increased practices were associated with being aged 65 or older, a woman, higher general trust scores, and having a cognitive disability (e.g. concentrating or remembering). Decreased practices were associated with being nonwhite, nonmetro, higher trust scores in President Trump, and having a communication disability.

We also ran a model that explored the interaction of disability by geographic location, but no interaction variables were statistically significant. These results are included in Table 5 as supplementary material.

Table 4
Linear regression of factors associated with mean number of CDC recommended practices.

Source	*B*	*SE B*	β	*t*	*p*
Constant	3.118	.484			
Age 65+ (Referent: < age 65)	.843	.354	.117	2.38	.018*
Women (Referent: men or other)	.534	.170	.148	3.15	.002**
Non-white (Referent: white non-Hispanic)	-.786	.193	-.192	4.07	.000***
College (Referent: < college)	-.037	.175	-.010	.21	.834
Nonmetro (Referent: metro and micro)	-.556	.264	-.103	2.10	.036*
Poor or fair health (Referent: > good health)	.300	.185	.080	1.63	.105
Trust in general information sources	.392	.121	.157	3.23	.001***
Trust in Trump	-.162	.063	-.125	2.60	.010**
Vision disability	-.226	.202	-.060	1.12	.264
Hearing disability	-.478	.251	-.109	1.90	.058
Mobility disability	-.396	.204	-.110	1.94	.053
Cognitive disability	.395	.177	.110	2.23	.026*
Selfcare disability	-.067	.235	-.017	.29	.775
Communication disability	-.801	.251	-.183	3.19	.002**

*$p \leq .05$, **$p \leq .01$, ***$p \leq .001$.

Discussion

Similar to prior research, we found that service providers were trusted the most, and both women and older respondents were more trusting than men and younger respondents.[41] Trust of service providers was lower among non-whites, relative to white non-Hispanics, which may relate to past health discrimination experiences that undermine trust.[3,12] Trust ratings aligned with adherence to COVID-19 recommended practices, where women, older, and white non-Hispanic respondents reported higher adherence than men, younger, and non-white respondents. Those with poor or fair health ratings also engaged in significantly more practices.

Noncore respondents reported lower levels of trust overall and adopted fewer CDC recommended practices relative to micro and metro respondents. A possible explanation might relate to perceptions that rural areas were safe from COVID-19 due to sparse populations, fewer mandated stay-at-home orders, and isolated case spikes early in the pandemic.[42]

Another interpretation may relate to the accessibility of health information. Past research indicates that health literacy is generally lower in rural areas, compared to urban areas[43,44] and may undermine trust and adherence to expert sources of information such as from healthcare providers, and government agencies.[13] Similarly, hearing and communication disabilities are associated with lower health literacy.[45] Results showed that people with hearing and communication difficulties reported significantly lower mean trust scores and engaged in fewer recommended practices than those without these disabilities. In the regression model, having a communication disability was a significant explanatory variable for lower adherence to recommended practices. In fact, noncore respondents were approximately twice likely to report a communication disability than metro respondents.

The regression model for recommended practices indicated that both trust in general information ($p \leq .001$) and trust in Trump ($p \leq .01$) explained variance in adherence to CDC recommended practices, but in opposing directions. President Trump's communications about COVID-19 have frequently conflicted with expert sources such as the CDC and Dr. Fauci.[40,46] Discordant messaging contributes to the polarization of community action. For example, wearing a mask in some rural communities has become a proxy for political affiliation and is ideologically, rather than scientifically driven.[47] Overall, lower perceived risk, lower levels of health literacy, and polarizing messaging may make it difficult for rural residents and those with hearing and communication disabilities to obtain, interpret, trust, and adopt recommended practices.

Recommendations should be consistent across information sources and spokespeople, and based on the best scientific evidence, particularly in an evolving crisis. Further, information needs to be understandable to all demographic groups through accessible formats, cultural considerations, readability guidelines, and non-scientific interpretations.[11] This is particularly important considering that individuals with intellectual and developmental disabilities may be at higher risk of COVID-19 complications.[48]

Limitations

The demographics of MTurk workers with disabilities and requirement for online engagement may bias these results. Additionally, cross-sectional data can only inform associations between factors, rather than causality. While the regression model explained 33% of the variance in adherence to COVID-19 recommended practices, there were missing explanatory variables, such as perceived risk of exposure and health literacy, which are generally lower in rural places and may have better explained variance captured by metro, micro, non-core places.

Despite these limitations, MTurk provided a platform for rapid data collection for a hard to reach population during an evolving crisis. The opportunity to describe a moment in the COVID-19 pandemic is a unique opportunity to learn how a sample of PwDs consume and use health information in the context of a public health crisis.

Conclusion

Rural residents and people with hearing and communication disabilities were less likely to trust information sources about COVID-19 than other sociodemographic groups. These same individuals were also less likely to adhere to CDC recommended practices for preventing the spread of COVID-19. This may be attributed to a lower perceived risk in rural communities, inaccessible and overly-complex health information, political ideology stemming from inconsistent messaging, or some combination of each. These findings highlight the importance of collaborating with trusted partners in the disability community to promote health messaging, particularly in rural communities where trust is generally lower. This information should be useful for health educators, rural practitioners, and others involved in addressing COVID-19 in order to better reach at risk groups with public health messaging.

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Disclaimer

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Presentation

Early versions of these results were presented to the Administration on Community Living.

Declaration of competing interest

We have no conflicts of interest to report.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.dhjo.2021.101062.

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