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Article

Physicians' Trust in Relevant Institutions during the COVID-19 Pandemic: A Binary Logistic Model

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Abstract: (1) Background: Little research has been done on professionals' perceptions of institutions and governments during epidemics. We aim to create a profile of physicians who feel they can raise public health issues with relevant institutions during a pandemic. (2) Methods: A total of 1285 Romanian physicians completed an online survey as part of a larger study. We used binary logistic regression to profile physicians who felt able to raise public health issues with relevant institutions; (3) Results: Five predictors could differentiate between respondents who tended to agree with the trust statement and those who tended to disagree: feeling safe at work during the pandemic, considering the financial incentive worth the risk, receiving training on the use of protective equipment, having the same values as colleagues, and enjoying work as much as before the pandemic; (4) Conclusions: Physicians who trust the system to raise public health issues with the appropriate institutions feel they share the same values as their colleagues, say they were trained in the use of protective equipment used during the pandemic, felt they were safe at work during the pandemic, enjoyed their work as much as before the pandemic, and felt the financial bonus justified the risk.

Keywords: responsibility; trust; willingness to work

1. Introduction

The COVID-19 pandemic demonstrated the importance of communicating effective public health interventions to both the public and the healthcare workers. Next to effective and fast communication, a critical factor in the success of a public health intervention is trust [1]. Citizens' trust in public health policies is of paramount importance to their willingness to comply with measures, especially if those measures are more difficult to implement and respect (e.g. wearing a mask in public or being in lockdown) [2]. It has been suggested that governments can use information intermediaries to gain public trust. These intermediaries can be experts meant to enhance the credibility of information presented to the public. Their presence in the public forum should increase public confidence and motivate citizens to comply with health policies [3]. It follows that professionals have a unique role in mediating public trust in government. This is especially important during public health emergencies when fast communication is needed. In turn, professionals need to trust the public health policies they advocate for. It is essential to assess professionals' confidence in national policies to ensure the success of public health interventions [4].

During a pandemic, public health officials need to make decisions quickly. For instance, during the COVID-19 pandemic, interventions had to be developed and evaluated with less information and less time than usual. However, health professionals are generally trained in evidence-based medicine which takes time to test, validate and be put into clinical guidelines. Therefore, despite the urgency of the public health situations faced by clinicians, evidence-based science has played a key role in ensuring decisions when developing and evaluating COVID-19 public health interventions. Moreover, evidence-based science has played a key role in credibility, viewed in all its aspects. Another important aspect, therefore, was access to enough sources that had credibility for both professionals and the public. Not surprisingly, identifying the sources used can enhance the credibility of health policy-making organizations. Once sources are identified, decision-making can become more transparent to both the public and health workers [4].

There is already a substantial body of research on public opinion on public health interventions. However, little research has been done on the perception of professionals during epidemics, although the latter is at least of similar importance. We argued that, in such a situation, professionals play a crucial role both in decision-making and in public trust. On the one hand, the success of public health interventions during an epidemic is linked to public trust in health professionals. On the other hand, public trust also depends on the public's belief that professionals are truly involved in the decision-making process [5,6]. Unfortunately, we know that public trust in decision-makers has declined [5]. Not surprisingly, lack of trust in science itself may also have increased public distrust in evidence-based health policies. Therefore, it is vital to understand doctors' perceptions of trust in policy makers. A key element in this endeavor is to examine professionals' trust in government agencies [4].

A study conducted in Israel on 112 public health workers investigated trust using 5-point Likert scales in May 2020, during the COVID-19 outbreak. An interesting result is that public health physicians' trust was lower than researchers' and other health professionals. The study also found that low-confidence health professionals were also less likely to use government tools to follow-up infected patients. The same doctors showed lower levels of trust in the Ministry of Health. Most health workers in the survey rated their involvement in decision-making as low or completely absent. In parallel, they reported lower levels of trust in policy than those with high involvement [4].

Another Israeli study conducted in the same period of time examined the factors influencing physicians' decision-making and preventive behaviour during the COVID-19 pandemic. The study investigated the responses of 187 Israeli physicians in April and May 2020 to a complex questionnaire including perceived risk during the epidemic, emotions, trust in the health system, and the level of physicians' compliance with preventive measures. Participants in their study were asked to indicate the levels of negative and positive emotions they felt during the last week, on a scale ranging from "not at all" to "extremely". The negative emotions included fear, anger, anxiety, stress, nervousness, bad mood, blame, and frustration while the positive emotions included enthusiasm, relaxation, strength, "sense of mission", pride, and activism. The researchers found that higher levels of trust in public institutions were associated with higher levels of compliance with Ministry of Health guidelines, higher positive emotions and more cautious decision making among physicians [7].

An older Japanese study [8] on the 2009 influenza pandemic is particularly relevant to this paper. The cross-sectional survey of willingness and reluctance to work during the H1N1 pandemic collected responses from 3635 employees at three core hospitals in Kobe City, Japan. The most influential factor that motivated people to work was the feeling of being protected by their country, local government, and hospital. Conversely, workers who were more reluctant to work were concerned about getting infected, compensation if they were infected, and feeling isolated. The authors concluded that professionals' trust in public organizations has significantly influenced their willingness to work during a pandemic. These findings show that physical protection against infection is important in itself as well as in relation to trust. Lessons from the H1N1 pandemic may be valuable for the COVID-19 pandemic [9].

Another study looked at doctors' trust in government agencies and scientists as a variable influencing their effectiveness as health policy communicators to patients. A total of 625 primary care physicians completed an online study dealing, among other things, with trust in media outlets as

opposed to trust in the government. The study challenged the assumption that doctors, because of their expertise, provide accurate and up-to-date information to their patients. Interestingly, researchers found that doctors are subject to the same biases that influence public opinion. Doctors' trust in the media influenced their concern that a family member might become ill, their perceptions of the seriousness of the pandemic, and their trust in government agencies and scientists [10].

It is also interesting to note that researchers studying the 2014-2015 Ebola virus disease epidemic in Liberia suggested a possible vicious cycle between mistrust, non-compliance, hardship, and further mistrust at the public level. The team of researchers conducted a study on approximately 1600 participants from the general public, between December 6, 2014 and January 7, 2015, in Monrovia, Liberia. Questions about the perceived capacity to react and trustworthiness of public institutions (e.g. the Liberian Ministry of Health) compliance with control measures (e.g. keeping a bucket with chlorinated water in the home), self-declared support for policies (e.g. the nighttime curfew) were asked. Some of the findings of this study support the idea that respondents who refused to comply with public health policies may have done so because they did not trust the ability or integrity of government institutions to recommend precautions and implement policies to slow the spread of Ebola. They also found that respondents who experienced hardship during the epidemic expressed less trust in the government than those who did not [2].

Taking into account the research done thus far, we conclude that more research on physicians' trust in the public institutions and policies, is a crucial factor that could provide evidence for policies devoted to increase public trust in these institutions. This research can identify the pathways to increase public trust and policy compliance during pandemics.

2. Materials and Methods

In this study, we used a logistical binary regression to build a profile for doctors who feel they can raise public health issues with relevant institutions. A total of 1285 Romanian doctors completed an online survey, between July and August 2020, belonging to a larger study pertaining to responsibility, medical ethics, a willingness to work and self-efficacy during the first wave of the COVID-19 pandemic [11–15]. The sample is nationally relevant, both demographically and in terms of the distribution of doctors by regions of Romania. Out of the total, 982 responders were females and 302 were males with one participant not specifying their gender. The gender distribution in our sample is also relevant to the gender distribution of doctors nationwide. The mean age of the sample was 48,21 years with a minimum of 25 and a maximum of 86. The participants belonged to all known specialties in the field of medicine.

The participants were asked to respond to socio-demographic question like age, number of members in the household etc. Questions about the medical specialty, years of practice, age and number of siblings were included. They also had to respond to statements for which they had to choose on a six-point scale ranging from 1 – totally disagree to 6 – totally agree. This scale was chosen to avoid the central tendency in responses.

In the larger study, the intent was to see if responses distribute themselves according to the theoretical models of connection between self-efficacy, willingness to work, duty to care. However, due to the nature of the data (e.g. most questions had a „not applicable“ response choice), we chose logistical binary regression able to compute large amount of data and to select relevant predictors for a particular answer.

All the 1285 participants responded to the main item about trust in the government "I felt I could raise public health issues with the relevant institutions". The mean score for this scale in the whole sample was 2,68 with a minimum of 1 and a maximum of 6. The median score of the scale was 2. To distinguish between the two groups, one tending to agree to this statement and one tending to disagree to this statement, we used the median and recoded a new binary variable. Scores higher than 2 (above median) were coded as "higher trust in relevant institutions" and scores equal with or less than 2 were coded "lower trust in relevant institutions". The frequency for the two modalities of the variable were 712 (55,4%) of the respondents who had lower trust (tended to disagree) and 573 (44,6%) of the respondents who had higher trust (tended to agree). Using the new dichotomic variable

as dependent variable for a binary logistic regression, we performed Backward-Wald computations to determine the best predictors for the two categories of responses. Logistical binary regression was used because most of the variables that could potentially be considered a predictor did not have a normal distribution. Another reason is that a lot of variables had a „not applicable“ choice, which would have biased attempts so use other types of statistical indicators.

3. Results

In this study, we used a logistical binary regression model to build a profile for doctors who felt they can raise public health issues with relevant institutions during the COVID Pandemic, in contrast with those who didn't trust enough these institutions to raise public health issues. The binary logistic regression model can show us several items. The responses to these items tend to predict an agreement or disagreement with the item "I felt I could raise public health issues with the relevant institutions". This way of analyzing data can give us a profile of the person who tends to agree or to disagree with the above item. Backward-Wald computation eliminates insignificant predictors and keeps only those variables which can participate in the binary logistic model. Therefore, the results can give us insight into the way of thinking of the doctor who feels they can raise public health issues with relevant institutions, in contrast with those who don't feel this way.

We reached five predictors that could differentiate between respondents who tended to agree with the trust statement (felt they could raise public health issues with relevant institutions) and those who tended to disagree with the same statement. The Cox and Snell pseudo R² coefficient were 0,09 and 0,12 respectively, indicating a modest correspondence between the model and the real data. The model was more exact with respect to those with lower trust (73%) than with those with higher trust (53%). See Table 1.

Table 1. Predictive model of the binary logistic regression.

Predictive model			
	lower trust (predicted)	higher trust (predicted)	Percentage Correct
lower trust (expected)	352	131	72.9
higher trust (expected)	198	221	52.7
Overall percentage			63.5

In the survey, the responders who agreed with the statement: "I felt I could raise public health issues with the relevant institutions" also tended to agree with the following statements: (1) I trusted that I was safe at work during the pandemic. (2) The financial bonus we were promised justifies the risk I took. (3) I have been trained on the use of protective equipment used during the pandemic. (4) My colleagues and I share the same values. (5) Compared to before the pandemic I enjoy my work just as much. Table 2 depicts each item along with the beta coefficient, the standard deviation and the Wald coefficient in the final model of the logistic binary prediction.

Table 2. Items with power of significant prediction in the binary logistic regression model.

Item in the general Questionnaire	B coefficient	Standard Deviation	Wald	Sig.
I trusted that I was safe at work during the pandemic.	.14	.05	8.78	<.01
The financial bonus we were promised justifies the risk I took.	.08	.04	4.59	.03
I have been trained on the use of protective equipment used during the pandemic.	.16	.04	19.46	<.01
My colleagues and I share the same values.	.17	.06	9.16	<.01

Compared to before the pandemic I enjoy my work just as much.	.11	.05	6.09	.01
Constant	-2.55	.32	64.10	<.01

4. Discussion

In this study, we used a binary logistic regression model to profile physicians who felt they could raise public health issues with relevant institutions versus those who felt they couldn't.

The first predictor we identified was agreement with the following item: "I trusted that I would be safe at work during the pandemic." This finding is consistent with the findings of Shahrabani et al. (2021) that higher levels of compliance were associated with higher levels of trust in the Ministry of Health and the healthcare system. The cited study found a positive significant relationship between trust in public institutions and personal compliance with preventive measures [7]. However, we argue that feeling safe at work can be construed as a result of personal compliance with rules as well as effective institutional policies in providing safety to hospital and clinic workers. This finding is also consistent with what Imai and colleagues (2010) found in relation to the H1N1 influenza epidemics. In their study, the most important factor that motivated people to work was feeling protected by their country, local government, and hospital [8]. Therefore, it is not surprising that the 1285 physicians in our study perceived a relationship between their sense of safety at work and their confidence in raising public health issues with relevant institutions. It is noteworthy that our prediction model is more accurate for physicians who disagree with the above statement. That is, disagreement with the statement "I trusted that I would be safe at work during the pandemic" predicted, among other variables, disagreement with the statement "I felt that I could raise public health issues with relevant institutions". This is consistent with the findings of Zohar and coworkers (2022) that physicians with low involvement in the decision-making process during the pandemic reported lower levels of trust in politics than those with high involvement [4]. It appears that trust is closely related to how physicians feel protected by these institutions and, in turn, physicians' willingness to engage and provide feedback on policy and public health concerns. Low levels of trust and involvement seem to correlate with feeling less safe during an outbreak. Promoting safety in the workplace and finding out what makes physicians feel safe in their workplace has a good chance of increasing trust in relevant institutions.

Another significant predictor in our binary logistic model was agreement with the statement "The financial bonus we were promised justifies the risk I took. First, it is important to look at the physicians in the half who disagree with the statement in the dependent variable. As we noted above, our predictive model is significantly more accurate for those physicians who tend to disagree with the statement "I felt I could raise public health issues with the relevant institutions" (73% agreement between the model and the actual data) than for those who agree with the statement (53% agreement). This means that disagreement with the statement "The financial reward we were promised justifies the risk I took" tended to predict a tendency to disagree with the statement "I felt I could raise public health issues with the relevant institutions. One possible interpretation of this finding is that physicians do not feel a respectful relationship between themselves and the public institutions involved in policy making and implementation. A financial bonus may have the paradoxical effect of increasing distrust of government, as physicians may feel that duty, rather than financial incentives, drove them to participate in efforts during the pandemic. One study showed that those who were less involved in the decision-making process had less trust in public institutions [4]. Another study found that higher levels of trust in public institutions were associated with higher levels of compliance with ministry of health guidelines [7]. We suggest that, at least for some physicians, it was a sense of partnership that promoted trust and policy implementation, rather than the asymmetric relationship between an employer using financial incentives and the employees. However, for those for whom the financial bonus was important, this incentive may have been interpreted as a sign of respect. There is insufficient data in our final model of logistic prediction to speculate further on the reasons behind this relationship. We suggest that a financial bonus may help

promote trust, but only if it is large enough to be perceived as a respectful way by public institutions to acknowledge the physician's efforts during an outbreak.

Physicians who were more likely to agree with the statement "I have been trained in the use of protective equipment to be used during the pandemic" were also more likely to feel that they could address public health issues. These data are also consistent with previous findings about trust between physicians and public institutions during a pandemic. Previous studies we reviewed did not look for a specific relationship between trust in institutions and receiving training. However, there is some consistent evidence of a strong relationship between trust and willingness to use government-provided tools and comply with safety measures. Zohar and coworkers found that health professionals who did not trust public institutions were also less likely to use government tools to track infected patients during the Covid-19 pandemic [4]. Higher levels of trust in public institutions were associated with higher levels of compliance with Ministry of Health guidelines [7]. Even in a study of the H1N1 outbreak, the most influential factor in motivating people to work was feeling protected by their country, local government, and hospital [9]. It is clear that training in safety measures can be perceived by health workers as a measure of protection and care by both hospitals and government agencies. As they promote trust, this can also be seen in the physicians' feeling that they can raise public health concerns. We don't claim that the feeling of trust necessarily translates into the behavior of raising public health issues with relevant institutions. However, our model suggests that more trust in the government and related agencies promotes the feeling that the physician can do so if needed. Of course, the reverse is also important: there is a tendency for respondents who disagree with having received training to also feel that they could not raise public health issues with relevant institutions. This could be explained by a feeling of "not being heard and not being cared for" that physicians might have during pandemic efforts. In conclusion, our results and previous findings strongly suggest that training in the use of protective equipment promotes trust in both the hospital and the public institutions involved in managing an outbreak.

An interesting finding is that, in our model, agreement with the statement "My colleagues and I share the same values" tends to predict agreement with the outcome variable "I felt I could raise public health issues with the relevant institutions". The sense of belonging to a professional community tends to extend to a sense of trust in relevant institutions. We could hypothesize that these public institutions are composed of the same doctors who make up the collegium of professionals. A doctor may have a greater or lesser sense of belonging to the community of professionals. And, in this sense, he might have more or less trust in the public institutions that are mainly populated by the same type of professionals. This is by far one of the most interesting findings. This predictor turned out to be the best in the whole model (beta coefficient = .17). We have not found such a relationship in the previous literature, so its further investigation may prove useful and even crucial for future situations when societies deal with outbreaks. The reverse is also true: not feeling that one shares the same values with colleagues translates into less confidence to raise public health issues. There seems to be an important link between the trust a physician feels towards his own professional community as a whole and the trust he feels towards relevant institutions. It is more difficult to translate this finding into a specific action. However, this finding suggests that a sense of belonging to a professional community that promotes the same values may play a key role in a physician's trust in relevant institutions. As a psychotherapist, one of the authors of this article suggests that some specific medical events and conferences should be organized to bring together members of the Directorate of Public Health, physicians working in hospitals and private practices, and members of the Ministry of Health. These events should be held on a regular basis to ensure a sense of belonging and shared values over time. Ultimately, this should translate into greater trust during the hardships of disease outbreaks, among individuals and groups that have cemented a degree of mutual respect and a sense of shared values.

Finally, agreement with the statement "Compared to before the pandemic, I enjoy my work just as much" also tends to predict agreement with the outcome variable "I felt I could raise public health issues with the relevant institutions". This finding is consistent with the positive and highly significant correlation found by Shahrabani and colleagues between trust and positive emotions

($r(198) = .24$; $p < .01$), and an even stronger and negative correlation between trust and negative emotions ($r(198) = -.34$; $p < .01$) [7]. This can be interpreted as a link between good working conditions and trust. However, general positive feelings in the workplace seem to influence trust as a positive emotion in itself. Feelings of helplessness and hopelessness often go hand in hand, as do feelings of control and job satisfaction. It is difficult to say how much of the relationship between trust and positive feelings can be explained by personality traits, the nature of physician-institution interactions, and contextual factors. However, it is likely that the promotion of general positive feelings and better working conditions plays a role in the trust physicians feel in institutions. Working conditions do matter, and decision makers should strive to improve working conditions, especially when the system is dealing with an outbreak that is taxing everyone's efforts.

Despite the large number of respondents, there are several limitations to this study. First, the Cox and Snell pseudo R^2 coefficients were .09 and .12, respectively, indicating a modest fit between the model and the actual data. This means that our results can mainly be used as indicators of trends rather than clear differences between categories of people. Second, the model was more accurate for those who tended to disagree than for those who agreed with the statement about trust. This further supports the idea that our findings serve as indicators for further hypotheses and not necessarily as hard distinctions. Aside from these limitations, the study worked with a large number of observations and used a safer way of computing data against false positives, which are often found in parametric statistical analysis.

5. Conclusions

In this study, we used a binary logistic regression model to profile physicians who felt they could raise public health issues with relevant institutions versus those who felt they couldn't. In our study, physicians who trusted the system to raise public health issues with relevant institutions felt that they shared the same values as their colleagues, reported that they were trained in the use of protective equipment used during the pandemic, trusted that they were safe at work during the pandemic, enjoyed their work as much as before the pandemic, and felt that the financial bonus justified the risk. In contrast, physicians who felt unable to raise public health issues with relevant institutions during the pandemic were more likely to feel that they didn't share the same values as their colleagues, to disagree that they had received training in the use of protective equipment, to disagree that they felt safe at work during the pandemic, and to disagree that they enjoyed their work as much as before the pandemic. Our results are broadly consistent with other findings about physicians' trust in institutions during outbreaks. To cultivate trust in institutions, policymakers should focus, even before an epidemic breaks out, on making health care workers feel safe at work, fostering a sense of belonging to the profession, cultivating the intrinsic rewards of the medical profession, training doctors in the use of protective equipment, and providing bonuses for higher-risk situations.

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Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Ethics Committee of University of Medicine and Pharmacy Gr. T. Popa Iaşi (protocol code RESPECT in 24.06.2020).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

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