

Southern African Journal of Policy and Development

Volume 5
Number 1 June 2020

Article 8

6-2020

Risk Perception, Behavioural Response to COVID-19, and the Mediating Role of Information Sources in Zambia

Byrne Kaulu

School of Business, Copperbelt University, Kitwe

Edna Kabala

School of Business, Copperbelt University, Kitwe

Rosemary Mapoma

School of Business, Copperbelt University, Kitwe

Christopher Munyonzwe

School of Business, Copperbelt University, Kitwe

Follow this and additional works at: <https://scholarship.law.cornell.edu/sajpd>



Part of the [African Studies Commons](#), and the [Public Health Commons](#)

Recommended Citation

Kaulu, Byrne; Kabala, Edna; Mapoma, Rosemary; and Munyonzwe, Christopher (2020) "Risk Perception, Behavioural Response to COVID-19, and the Mediating Role of Information Sources in Zambia," *Southern African Journal of Policy and Development*. Vol. 5 : No. 1 , Article 8.

Available at: <https://scholarship.law.cornell.edu/sajpd/vol5/iss1/8>

This Article is brought to you for free and open access by the Journals at Scholarship@Cornell Law: A Digital Repository. It has been accepted for inclusion in Southern African Journal of Policy and Development by an authorized editor of Scholarship@Cornell Law: A Digital Repository. For more information, please contact jmp8@cornell.edu.

Risk Perception, Behavioural Response to COVID-19, and the Mediating Role of Information Sources in Zambia

Byrne Kaulu, Edna Kabala, Rosemary Mapoma, and Christopher Munyonzwe

(School of Business, Copperbelt University, Kitwe)

The role of information sources in mediating the relationship between behavioural responses to COVID-19 and its determinants has hardly been studied. This study fills the knowledge gap with a focus on Zambia, a middle-income country. Data was collected using an online questionnaire. The key independent variables were risk perception of COVID-19, risk perception of the health care system (local and global), and risk perception of the big five global health problems (HIV/AIDS, cancer, injury from road traffic accidents, influenza, and diabetes). Risk perception of the health care system was measured by looking at whether or not the respondents trust the World Health Organisation (WHO) and Ministry of Health (MoH) backed COVID-19 vaccines. The three Independent Variables (IV) of risk perception predicted behavioural response as a Dependent Variable (DV). The behavioural response was found as an average of responses on a five-point Likert scale of questions, relating to safety measures taken by respondents against COVID 19. The relationship between IVs and the DV was hypothesised to be mediated by information sources. Information sources were measured by the frequency with which respondents obtained information about COVID-19 from various sources. A statistically significant positive relationship was found between risk perception of the health system and information sources. The same was not true for the other two independent variables. Further, a statistically significant indirect effect was found between risk perception of health systems and behavioural responses (mediated by information sources). Our findings can be used to influence policy, practice, and scholarship on sources of information for COVID-19 and expected behavioural responses. It is recommended that policy on sources of public health information be directed towards enhancing credible sources of information. Future studies must consider using longitudinal data. The big five health risks should include malaria and tuberculosis (TB), making it the big seven. Corruption's role in risk perception of health systems should also be explored.

1. Introduction

The novel coronavirus disease 2019 (COVID-19) was recently categorised as a pandemic by the World Health Organization (Samir et al., 2020). Like many health pandemics, it evolves rapidly with negative repercussions the world over (Betsch et al., 2019a). Particularly,

authorities in many countries need to provide effective responses to the overwhelming burden that COVID-19 places on human life, economic activities, and financial systems. The infectious COVID-19 spreads through person to person contact with infected respiratory fluids and contaminated surfaces, causing respiratory distress and death, in the worst cases (Shabu et al., 2020). The challenge of eliminating the pandemic is exacerbated by the lack of a known cure, amidst inevitable human interaction surrounding regular economic and social activities. This creates a trade-off for experts and authorities alike in attempts to provide information that is reliable and useful for sustainable protection of citizens. On the one hand, authorities need to disseminate information that safeguards human health. On the other, authorities need to provide prudent guidance on appropriate interventions and policies for evading the high risk of infection. Amidst these struggles is a critical element of rapidly adapting informative messages and encouraging widespread behavioural change for assured protection.

The relationship between perceived risks and behavioural responses may be considered when one examines the uptake of available information on deadly pandemics. The rapid adoption of recommended behavioural change is hailed to generate significant survival benefits (Strong & Ansons, 2020). The availability of reliable information sources on evolving pandemics, such as COVID-19, may embody certain attributes that encourage compliance with recommended adaptive behaviour. Evidence suggests that lack of data or information generally drives unpreparedness to contain deadly diseases and discourages positive attributes for change in behaviour (Betsch et al., 2019a; World Economic Forum, 2019; World Health Organisation, 2020). According to the World Health Organisation (2017), a perceived lack of consistency, competence, fairness, objectivity, empathy, or sincerity in crisis response in the public could lead to distrust and fear. On the contrary, when these characteristics are packaged in informational sources and communicated with ease for people to understand, uptake and adaptive behaviour are more effective. Change in widespread behaviour is also likely to be prompt if information sources are specifically designed for specific groups and accessible by the public. Furthermore, information sources with indications of the necessary services that are available during pandemics help people to make informed choices, protect themselves, and comply with recommended practices (Betsch et al., 2019a; Hou et al., 2020; Khosravi, 2020).

Perceptions of the risk of infections often have an influence on the adopted protective behaviours by individuals. However, the perceived risks by people do not necessarily equal the actual risk that people are faced with. Betsch et al., (2019) while citing the example of the 2009-2010 influenza outbreak, note that uncertainty and perceived exaggeration were associated with a reduced likelihood to implement the recommended behaviour. Accordingly, risk communication and crisis models propose that understanding risk perceptions is important for appropriate and effective crisis response (Betsch et al., 2019a; Hou et al., 2020; Khosravi, 2020; Reynolds et al., 2007).

At the global level, the first case of COVID-19 was reported in December 2019 in China (Samir et al., 2020). The virus rapidly spread to nearly all parts of the world in the first quarter of 2020. By 2 June 2020, more than 6.27 million cases were recorded in 188 countries, with 375,000 deaths and more than 2.69 million recoveries (Johns Hopkins University, 2020). The first two cases of COVID-19 in Zambia were reported on national television by the republican President on 18 March 2020. By the end of May 2020, the Ministry of Health reported an accumulated 1,057 cases with 779 recoveries and seven deaths. A pandemic wrecking such havoc requires safety-enhancing behaviour. Equally important is knowing the determinants of such behaviour and any mediators.

1.1 The Overarching Problem

The challenges and uncertainty surrounding the evolution of COVID-19, as well as its impact on livelihoods, cannot be underestimated (Karasneh et al., 2020). The complex interplay of changing epidemiology, media attention, pandemic control measures, risk perception, and public health behaviour makes the situation even more pronounced (Betsch et al., 2019b). Although some risk perceptions and insights on behavioural responses amidst COVID-19 have been established by scholars (Betsch et al., 2019a; Hou et al., 2020; Khosravi, 2020), there is still scope for extensive contextual research. Shabu et al. (2020) studied risk perception and behavioural response to COVID-19 in Iraq, taking interest in academics and the student populace. Hou et al., (2020) also attempted to assess public attention, risk perception, emotion, and behavioural response to the COVID-19 outbreak in real-time using social media surveillance in China. Besides these country studies on COVID-19, the authors of this paper understand that there is no research that avails the link between perceived risk and behavioural response in the African policy context. This is exacerbated by lack of knowledge diffusion and uptake through appropriate informational sources in particular country contexts in Sub-Saharan Africa.

Yet, like Strong and Ansons (2020) observe, the existence of emerging contextual research is critical to the application of behavioural science in responding to the fight against COVID-19. The recognition of social, institutional, and cultural processes should be considered as this significantly influences the way individuals perceive risk, also shaping resultant responsive behaviour. Therefore, this study aims to examine information sources as a mediator in the relationship between risk perceptions and behavioural response to COVID-19. This study is critical because it looks at information sources as a mediating factor in shaping behavioural responses to COVID-19 in the Zambian context. The use of data and responses from the Zambian populace will feed into the existing literature on COVID-19 research in Africa. Further, the study will be useful in informing policy on the way risk perceptions are evaluated by the public. The Zambian government and public health line authorities may use findings from this study to understand how people perceive the risk of

contracting COVID-19, which may eventually mould their behavioural responsive. The findings will further aid policy guidance on establishing whether the current information sources suffice in the fight against COVID-19, the best ways of communicating protective measures, as well as encouraging appropriate behaviour in real-time.

Thus, the study carries academic and policy relevance, adding to scholarly data generation and literature on COVID-19, containing information from a low-cost perspective of preventing COVID-19 in Zambia. This may help in reducing virus transmission, human mortality, and restoring the focus on economic and social sustainability goals in the country and beyond.

The rest of the paper is structured as follows: section two provides a review of extant literature. Section three presents the methodology adopted in the study, while section four discusses the research findings. Section five gives the conclusions of the study and suggests some policy recommendations.

2. Literature Review

2.1 Conceptualisation of Variables in the Study

2.1.1 Conceptualising Risk Perception

Our independent variable is risk perception. At the core of this variable is risk. Risk is a mixture of the magnitude of a distinct hazard and the possibility or frequency of occurrence of that hazard (Marshall, 2020). Therefore, in the context of our study, risk perception is the magnitude and likelihood that a health hazard will occur. This was measured by the respondents' self-reported attitudes (on a five-point Likert scale) towards presented hazards.

Brewer et al. (2004) assert that risk perceptions and subjective appraisals of a situation greatly determine whether recommended protective action is likely to be adopted and when this would occur. Theoretical perspectives and empirical research are increasingly more comprehensive in defining what contributes to risk perceptions, situation awareness, and risk-reduction behaviours during an emerging infectious disease outbreak. According to the Protection Motivation Theory (PMT) (see (Rogers, 1975)), the general public's intention to adopt protective measures is considerably influenced by high levels of perceived risk. The theory postulates that public perception of the intensity and severity of a certain health risk contributes to their risk perception about a disease.

2.1.2 Conceptualising Behavioural Response

The Stimulus-Organism-Response (SOR) model (Zeeland, 2018) provides insights for conceptualising behavioural response. Provided you have a condition (say COVID-19) which in the model is termed a stimulus, your response would be to either approach it or avoid it. Avoiding in this context entails taking measures that reduce or eliminate your exposure to it. Approaching means not taking such measures.

2.1.3 Conceptualising Information Sources

In the last couple of months, official WHO internet sources are reported to have received only a few engagements, while so-called conspiracy theory posts received above 52 million (Mian & Khan, 2020). It is therefore imperative that discussions of sources of information be brought into scholarship and fed into policy. Limaye et al. (2020), do a good job of explaining how social media has now become a trusted source of information about COVID-19 for many. In our study, we consider social media in addition to traditional sources such as websites, workplace updates, Ministry of Health updates and WHO updates. We also consider delivery channels such as print media and digital media. Listening to the radio or watching television are also considered via a battery of questions. Respondents were asked how often they use each of these. Their responses were measured on a Likert scale with 1 being never and 5 being very frequently. A composite variable (Information Sources) is computed as per our methods section.

2.2 Hypotheses and Model Development

HIV/AIDS and motorcycle accidents were, inter alia, found to be big perceived health challenges among the Cameroonian population (Tandi et al., 2018). In this same study, women perceived more health risks than men. Age differences were also noted. Respondents above forty years of age reported lower health risk concerns than those under forty. Tandil et al., (2018) further add that greater confidence was reported in information from health personnel than that from media and other sources.

Other studies have also pointed out several more public health risks such as diabetes, cancer, and influenza (Betsch et al., 2019b; Lee & You, 2020). According to Betsch et al. (2019), the paradox of the relationship between an individual's risk perceptions and their protective behaviour is that it is not firmly correlated with actual risk. They argue that perceived exaggeration and uncertainty, for instance, were linked to the reduced likelihood of an individual implementing recommended behaviours in the 2009/2010 influenza pandemic. If you read in between the lines, communication plays a role in behavioural

responses. There being no identified study in the Zambian and sub-Saharan context, our study adds to the body of knowledge the following hypotheses.

H1: There is a positive relationship between risk perception of the big five health risks and information sources.

People who sense risk are more likely to spend more time looking out for and processing information that might help reduce this risk. Previous studies suggest that media sources can influence risk perception. In a study on the influence of four media sources (newspapers, magazines, books, and television) on risk perception in New York State, Coleman, (1993) found that media sources have a limited influence on both personal and voluntary societal risk. Ford et al., (2007) in their survey of cancer perceptions, found that individuals who perceived their colon cancer risk to be higher than average were also more likely to have sought cancer information. According to Han et al., (2007) the nature of that information plays a role in influencing risk perceptions. The study further showed that the perception of inconsistency in available messages about cancer-risk reduction led to people feeling more at risk and viewing cancer as less preventable.

We grouped the top five global health risks in our adapted questionnaire (Shabu et al., 2020) and termed these risks as the big five (HIV/AIDS, cancer, diabetes, injury from a road traffic accident, and influenza). It is important to note that in the African context, malaria and tuberculosis would be candidates for the big five, making it the big seven. However, we do not consider them here in order to maintain comparability with studies in other parts of the world.

Effective and proper risk communication is critical in influencing positive behavioural response in a pandemic (Wong & Sam, 2011), such as the COVID-19 crisis (Abrams & Greenhawt, 2020). Unfortunately, such effectiveness may be a challenge with so many sources of information available. Studies show mixed results around information sources and COVID-19 risk perceptions. Higher social media is linked to higher risk perception of COVID-19 in Vietnam – China's neighbour (Luu & Huynh, 2020). However, informal sources of information coupled with culture are purported to be sources of lower COVID-19 risk perception in the context of Chinese students in Australia (Ma et al., 2020). Wong and Sam (2011) find a positive correlation between the amount of information received and knowledge as well as other behavioural responses in the context of an H1N1 pandemic in Malaysia. It is, therefore, proposed that:

H2: There is a positive relationship between risk perception of COVID-19 and information sources.

Trust and confidence models suggest that trust is important in shaping risk perceptions and managing risk (Siegrist et al., 2003). Hearing, interpreting, and responding to public health messages during a pandemic is highly dependent on the trust that the public has in the source of the information. However, public outcry about confidence in health systems and vaccinations has been around for years. Occasional concerns about the safety of a COVID-19 vaccine and trust in health systems (WHO and the local Ministry of Health (MoH)) simply add to those challenges. However, in a study on COVID-19 perceptions in Egypt, 73% of respondents expressed willingness to take a vaccine once it is available (Samir et al., 2020). It is not clear how risk perceptions of the health system are associated with information sources in the Zambian context. Consequently, this study postulates as follows:

H3: There is a relationship between risk perceptions of health systems (WHO and MoH) and information sources.

The study of media's effect on various aspects of human behaviour is a subject of many scholarly works (Karasneh et al., 2020; Ma et al., 2020). Media is key in shaping COVID-19 preventive behaviours (Karasneh et al., 2020). The internet, social media, friends, and family are some of the health information sources influencing risk perception and hence behavioural responses (Lindell & Hwang, 2008; Ma et al., 2020; Scherer & Cho, 2003). Formal sources of information were also found to be positively related to the adoption of health-protective behaviours in Cowling et al. (2010). Several other studies concentrate on aspects of the relationship between information sources and safety behavioural responses (J. W. Burns et al., 1993; Chung, 2011; Jones & Salathe, 2009; Kasperson & Kasperson, 1996; Renn & Levine, 1991; Weerd et al., 2011). While these studies provide insight into the that role information sources play in influencing behavioural responses, they do not do so for the context of Zambia or even Africa generally. Therefore, our study proposes that:

H4: Access to sources of information has a relationship with behavioural responses to COVID-19.

An individual's protective behaviour is influenced by their risk perceptions (Betsch et al., 2019b). This is echoed by Marshall (2020), who states that "risk perception influences safety behaviour." The study of behavioural responses to COVID-19 is gaining increasing attention among scholars. However, there is still much to be done in the context of parts of the world other than Asia. Many of the recent studies including Lee and You (2020) and Shabu et al (2020), have been in the context of Asia or the Middle East. To keep up to pace, our study covers Zambia, a middle-income country in sub-Saharan Africa. Being a relatively new study area, we adopted our research instrument from Shabu et al., (2020).

H5: Risk perception has an effect on behavioural responses to COVID-19 via sources of information.

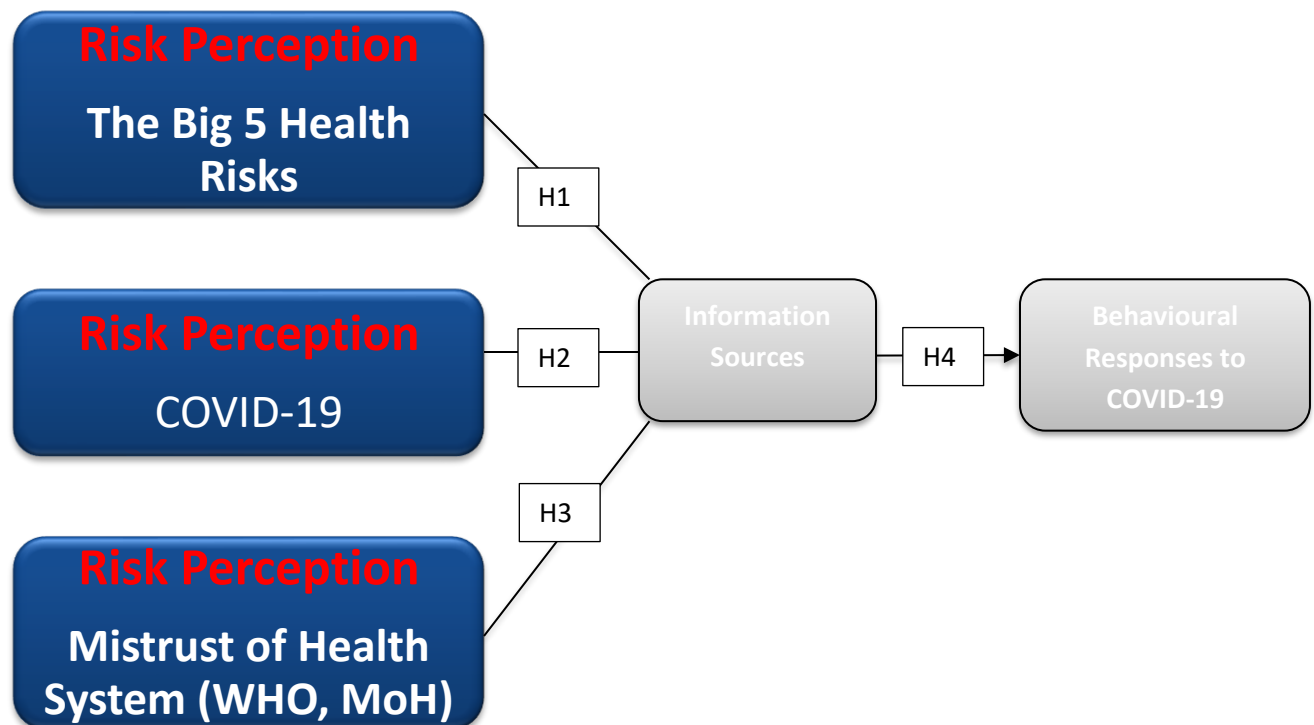
H5a: Risk perception (COVID-19) has an effect on behavioural responses to COVID-19 via sources of information.

H5b: Risk perception (Health System) has an effect on behavioural responses to COVID-19 via sources of information.

H5c: Risk perception (Big five) affects behavioural responses to COVID-19 via sources of information.

Figure 1 summarises the conceptual model for our study.

Figure 1: Conceptualisation of the Model in the Study



Source: Authors (2020)

For an explanation of the model, see Table 1.

Table 1: Variables in the Conceptual Model

Independent variable	Mediator	Dependent variable
Risk Perception – The Big 5 Health Risks Risk Perception – COVID-19 Risk Perception – WHO & MoH	Information Sources	Behavioural Responses

Source: Authors (2020)

3. Methods

This research followed a quantitative approach (Okello & Ntayi, 2019). An online questionnaire was randomly distributed to respondents via social media. This was done in line with extant literature on COVID-19 risk perceptions (Karasneh et al., 2020; Shabu et al., 2020). Questions regarding risk perceptions, information sources, and behavioural responses were measured on a five-point Likert scale; one of the most popular graded response items data collection instruments (Lorenzo-Seva & Ferrando, 2014). The behavioural response was found as an average of responses on a five-point Likert scale of fifteen questions relating to safety measures taken by respondents against COVID-19. Examples of questions included: I wear gloves when I am out and I wear a mask when I go out. Respondents had to choose whether they never, seldom, sometimes, often or always do so. Information sources were measured by how frequently respondents use each of the nine information sources as detailed in Section 2.1.3. Cronbach’s alpha of 0.841 and 0.7 were found for behavioural response and information sources constructs respectively; suggesting reliability of the scales.

Control variables identified from extant literature (Karasneh et al., 2020) were measured through questions asking for age, gender, number of physical contacts a respondent had in the last 24 hours, and a respondent’s household size. Age was measured as a continuous variable, gender as a categorical variable (0 for male and 1 for female) and the other two control variables were measured using categories as shown in Table 3. Of all respondents targeted, 182 filled in the questionnaire. This should be sufficient for a margin of error (Kim & Bang, 2016) of not more than 7% using the Raosoft sample size calculator (Burns et al., 2019).

The sample profile of respondents is shown in Table 2. Among the respondents, 42.3% were female. Over 80% of the respondents reported having made physical contact with 1 to 10 people outside their home. Close to 99% of the respondents reported being in a home of one to six people. The age range 21 to 30 years had the most respondents (57.1%). This suggests that most social media users (who were our target population) are in this age range.

Table 2: Sample Profile

		Frequency	Per cent	Cumulative Percent
Gender	Male	105	57.7	57.7
	Female	77	42.3	100.0
	Total	182	100.0	
Age	15 to 20 years	16	8.8	8.8
	21 to 30 years	104	57.1	65.9
	31 to 40 years	43	23.6	89.6
	41 to 50 years	13	7.1	96.7
	Above 50 years	6	3.3	100.0
	Total	182	100.0	
Physical contacts outside home in the last 24 hours	Zero	50	27.5	27.5
	1-5	51	28.0	55.5
	6-10	46	25.3	80.8
	11-20	15	8.2	89.0
	21-50	14	7.7	96.7
	51-100	4	2.2	98.9
	>100	2	1.1	100.0
	Total	182	100.0	
Household Size	One	12	6.6	6.6
	2-5	97	53.3	59.9
	6-10	70	38.5	98.4
	>10	3	1.6	100.0
	Total	182	100.0	

Source: Authors (2020)

For comparison purposes, the research instrument was adapted from prior research (Shabu et al., 2020). A battery of questions was presented to the respondents. Principal component analysis was used to reduce the components. Using varimax rotation, three components with factor loadings as per Table 3 were evident.

Table 3: Principal Component Analysis

	<i>Component</i>		
	<i>1</i>	<i>2</i>	<i>3</i>
How much of a threat is HIV/AIDS?	.809	.053	.181
How much of a threat is cancer?	.758	-.009	.165
Risk of unintentional injury from a road traffic accident is...	.739	.020	.160

Kaulu, Kabala, Mapoma, and Munyonzwe, 'COVID-19, Risk Perception, Behavioural Response, and Information Sources in Zambia

Diabetes threat levels are?	.716	.141	.241
How much of a threat is influenza?	.595	-.025	-.044
How much trust would you have in WHO COVID-19 interventions?	.055	.789	.095
How much trust would you have in a COVID-19 vaccine?	-.057	.760	-.074
How much trust would you have in a COVID-19 cure?	.062	.755	.045
How much trust would you have in the current MoH COVID-19 interventions?	.055	.744	.001
After getting COVID-19 the risk of a serious illness is...	.210	.065	.855
After getting COVID-19 the risk of dying is...	.046	.022	.854
Personally, the risk of getting a COVID-19 infection is...	.221	-.026	.632
Eigenvalues	3.437	2.279	1.408
Variance explained (59.36%)	28.64	18.99	11.73
Cronbach's α - reliability test	0.791	0.761	0.728

Source: Authors (2020)

We named the first component risk perception of the big five. This represents how respondents perceive risks regarding five major causes of health problems globally i.e. HIV/AIDS, cancer, Road Traffic Accidents (RTA), diabetes, and influenza. Risk perception of influenza did not fall above the minimum factor loading (0.60) recommended in some literature (Ramadhan et al., 2017). However, it was kept in the model for comparability with studies in other regions of the world. The low factor loading also confirms how low the risk perception of influenza is in this part of the world. The second component was the risk perception of the health care systems. This shows whether respondents trust the health system, or view it as a risk to their health care. The questions that loaded together in this component include those asking the respondents how they view/trust or otherwise; the WHO, the MoH, potential cures, and vaccines. The final component was named 'risk perception - COVID-19'. This represents the respondents' perception of the risk of COVID-19.

Reliability analysis showed Cronbach's alpha (α) of 0.791 for risk perception of the big five, 0.761 for risk perception of the public health system, and 0.728 for risk perception of COVID-19 itself. Since they were all above 0.7, this confirms the reliability of the constructs (Osborne et al., 2008; Pallant, 2011). Items relating to information systems and behavioural responses yielded Cronbach's alphas of 0.700 and 0.841 respectively.

Further statistical analyses were conducted in the Statistical Package for Social Sciences (SPSS) Version 20. The main analyses conducted were correlation and bootstrap mediation using the PROCESS macro by Hayes (2018). Mediation analysis was popularised by Baron and Kenny (1986). However, much of the recent literature on mediation refers to the work of Preacher & Hayes (2008) and Hayes (2018). Consider a predictor variable (X)

and the outcome variable (Y). Where there is a mediator (M); Hayes (2018) states that “variation in X causes variation in one or more mediators M, which in turn causes variation in Y.”

Table 4 shows Pearson correlations among the dependent variable (behavioural responses), independent variables (risk perceptions), Moderator (information sources) and the control variables (age, gender, household size, and physical contacts in the last 24 hours). All correlations were below 0.5 and many were not statistically significant. Multicollinearity is therefore not expected to be an issue (Mwiya et al., 2019; Osborne et al., 2008). Among the control variables, gender had a weak statistically significant correlation with the outcome variable (behavioural responses). Other statistically significant relationships were; between sources of information and behavioural responses, risk perception of the health system and behavioural responses, physical contacts outside the home and information sources, perceived risk of health systems and sources of information, age and physical contacts outside the home, risk perception of the health system and household size, as well as the relationship between COVID-19 risk perception and risk perception of the big five diseases.

Table 4: Correlation Analysis

Variables	Mean	SD	N	1	2	3	4	5	6	7	8
Behavioural responses to COVID-19	3.884	0.594	182								
Sources of COVID-19 information	3.265	0.612	182	.285**							
How old are you? (Number only)	28.885	9.214	182	.023	.143						
Please select your gender	0.423	0.495	182	.205**	.047	-.017					
Physical contacts outside the home in the last 24 hours	1.516	1.386	182	-.065	.268**	.220**	-.087				
Number of people in your home	2.352	0.628	182	.003	-.038	-.024	.123	-.083			
Perception risk of the	2.445	0.864	182	.052	.002	-.016	.105	-.104	-.040		

big five diseases Perception	3.071	0.883	182	.184*	.247**	.074	.092	-.046	.146*	.086
risk of the health system Perception	3.108	0.973	182	-.070	.078	-.010	.084	.020	.133	.377**
risk of COVID-19										.060

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Source: Authors (2020)

Based on correlation analysis (Table 4), H3 was supported. This means that the evidence suggests that there is a statistically significant relationship between risk perception of the health system (WHO, Ministry of Health, cures and vaccines) and sources of information. It is important to note however that this relationship is relatively weak. H1 and H2 were not supported. The risk perception of the threat of COVID-19 and the big five health risks do not have a statistically significant relationship with sources of information about COVID-19. H4 was also supported. This confirms that increased access to sources of information has a statistically significant relationship with behavioural responses to COVID-19. To test H5 and its sub-hypotheses, mediation analysis was done. Table 5 summarises the results.

Table 5: Mediation Analysis (5,000 Bootstrap Samples, 95% Confidence Interval)

Model	Independent variable (X)	Mediator (M)	Dependent variable (DV)	Effect of X on M (a)	Effect of M on Y (b)	The indirect effect of X on Y through M (a x b)
1	Risk perception - Big five	Information sources	Behavioural responses	0.0015	0.2764***	0.0004
2	Risk perception - Health system (WHO, MoH, vaccine, cure)	Information sources	Behavioural responses	0.1713	0.2474	0.0424*
3	Risk perception - COVID-19	Information sources	Behavioural responses	0.0489	0.2835	0.0139

***Significant at $p < 0.001$; **Significant at $p < 0.01$ and *Significant at $p < 0.05$

Source: Authors (2020)

Hypothesis H5b was supported. This implies that the indirect effect of the risk perception of the health system (WHO and Ministry of Health interventions, cures, and vaccines) on behavioural responses through information sources was statistically significant ($p < 0.05$).

H5a and H5c were not supported. This implies that the risk perception of the big five health risks does not have a statistically significant effect on behavioural responses to COVID-19 via information sources. There was not enough evidence either to support the hypothesis that the risk perception of COVID-19 has a statistically significant effect on behavioural responses to COVID-19 via information sources.

4. Discussion

This study has assessed information sources as a mediator in the relationship between risk perception and behavioural response to COVID-19. Risk perception of the health system had a statistically significant positive relationship with information sources. This means that the more the risk perception of the health system (WHO, MoH, cures, and vaccines), the more respondents are likely to seek additional sources of information. This finding is similar to that of Luu and Huynh (2020). It is important to note that although seeking information may be good for people, the quality of this information may also present challenges. Some sources of information (such as social media) could mislead the masses because of lack of or limited oversight over these publications. Policymakers and practitioners can play a critical role in ensuring that accurate information is available instead. H1 and H2 were not supported. That is to say, the relationship between risk perception of the big five health risks and information sources was not statistically significant. Neither was that of the relationship between risk perception of COVID-19 and information sources. These findings seem to be in line with Coleman (1993), but against Ford et al. (2007). The lack of correlation between information sources and risk perception could be because the nature of the information also plays a critical role in information seeking (Han et al., 2007). Finally, a statistically significant indirect effect of risk perception of the health system on behavioural responses via sources of information was found. This implies that to influence behavioural responses to the COVID-19 pandemic, both the sources of information and people's risk perceptions of the health system have to be considered.

5. Conclusion

This study has assessed information sources as a mediator in the relationship between risk perception and behavioural response to COVID-19. Data was collected using an online questionnaire from respondents in Zambia. The key independent variables were risk perception of COVID-19, risk perception of the health care system (local and global), and risk perception of the big five global health problems (HIV/AIDS, cancer, injury from road traffic accidents, influenza, and diabetes). Risk perception of the health care system was measured by looking at how respondents view the WHO, MoH, COVID-19 cures, and vaccines in terms of trust. The three independent variables (IV) of risk perception predicted behavioural

response as an outcome variable (DV). The relationship between IVs and the DV was hypothesised to be mediated by information sources. Information sources were measured by where respondents mostly obtained information about COVID-19. A statistically significant positive relationship was found between risk perception of the health system and information sources. The relationship between risk perception of COVID-19 and behavioural responses to COVID-19 and that between risk perception of the big five health risks and behavioural response to COVID-19 were both not statistically significant. Further, a statistically significant indirect effect was found between risk perception of health systems and behavioural responses (mediated by information sources). It is also important to note that the more recent Hayes (2018) bootstrapping approach was used for mediation analysis rather than the old Baron & Kenny (1986) approach. The former does not suffer from several of the restrictions that the latter does.

6. Recommendations

It is recommended that sources of information (social media, print media, and websites) be carefully used to influence behavioural responses to COVID-19 as the findings suggest. Policy, practice, and scholarship must focus on the role sources of information for COVID-19 play in fostering expected behavioural responses. Future studies must consider using experimental manipulation and/or longitudinal data. Additionally, the big five health risks should include malaria and tuberculosis, to make it the big seven. This study can also be extended to other countries and regions so that more global perspectives are built around the mediation role of information sources in the relationship between risk perceptions and behavioural responses to COVID-19. The role corruption plays in risk perception of health systems can also be explored.

References

Abrams, E. M., & M. Greenhawt. 2020. "Special Article: Risk Communication During COVID-19." *The Journal of Allergy and Clinical Immunology: In Practice*. <https://doi.org/10.1016/j.jaip.2020.04.012>

Baron, R.M., & D.A. Kenny. 1986. *The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations*. 51(6), 1173–1182. <https://doi.org/10.1037//0022-3514.51.6.1173>

Betsch, C., L.H. Wieler, & K. Habersaat. 2019a. "Monitoring Behavioural Insights Related to a Risk-Based Approach Is Best for Decision Making on Holding Mass Gathering Events." *The Lancet*, 395(10232), 1255–1256. [https://doi.org/10.1016/S0140-6736\(20\)30729-7](https://doi.org/10.1016/S0140-6736(20)30729-7)

Brewer, N.T., N.D. Weinstein, C.L. Cuite & J.E. Herrington. 2004. "Risk Perceptions and their Relation to Risk Behavior." *Annals of Behavioral Medicine*, 27(2), 125–130. https://doi.org/10.1207/s15324796abm2702_7

Burns, D., K. Rosbottom, & J. Mitchell. 2019. "Is the Bladder Filling Protocol for Prostate Cancer Patients Undergoing Radiotherapy Fit for Purpose?" *Radiography*, 26(2020), S29. <https://doi.org/10.1016/j.radi.2019.11.071>

Burns, J.W., P. Slovic, R.E. Kasperson, X.J. Kasperson, O. Renn & S. Emani. 1993. *Incorporating Structural Models into Research on the Social Amplification of Risk: Implications for Theory Construction and Decision Making*. 13(6).

Chung, I.J. 2011. *Social Amplification of Risk in the Internet Environment*. 31(12) Vol. 31 No. 12, pp. 1883–1896. <https://doi.org/10.1111/j.1539-6924.2011.01623.x>

Coleman, C. 1993. The Influence of Mass Media and Interpersonal Communication on Societal and Personal Risk Judgments. *Communications Res.* 20, 611–628. <https://doi.org/10.1177/009365093020004006>

Cowling, B.J., D.M.W. Ng, D.K.M. Ip, Q. Liao, W.W.T. Lam, J.T. Wu, J.T.F. Lau, S.M. Griffiths & R. Fielding. 2010. *Community Psychological and Behavioral Responses through the First Wave of the 2009 Influenza A (H1N1) Pandemic in Hong Kong*. 202(6), 867–876. <https://doi.org/10.1086/655811>

Ford, J.S., E.J. Coups, & J.L. Hay. 2007. "Knowledge of Colon Cancer Screening in a National Probability Sample in the United States." *Journal of Health Communication: International Perspectives*, October 2014, 37–41. <https://doi.org/10.1080/10810730600637533>

Han, P.K.J., R.P. Moser & M.P.W. Klein. 2007. "Perceived Ambiguity About Cancer Prevention Recommendations: Relationship to Perceptions of Cancer Preventability, Risk, and Worry." *Journal of Health Communication: International Perspectives*, October 2014, 37–41. <https://doi.org/10.1080/10810730600637541>

Hayes, A.F. 2018. *Introduction to Mediation, Moderation and Conditional Process Analysis: A Regression-Based Approach* (2nd ed.). The Guilford Press.

Hou, Z., F. Du, H. Jiang, X. Zhou, L. Lin, T. Assessment & N.H. Commission. 2020. *Assessment of Public Attention, Risk Perception, Emotional and Behavioural Responses to the COVID-19 1 Outbreak: Social Media Surveillance in China.*

Ibuka, Y., G.B. Chapman, L.A. Meyers, M. Li & A.P. Galvani. 2010. *The Dynamics of Risk Perceptions and Precautionary Behavior in Response to 2009 (H1N1) Pandemic Influenza.* <https://doi.org/10.1186/1471-2334-10-296>

Johns Hopkins University. 2020. *Dashboard, COVID-19.* <https://coronavirus.jhu.edu/map.html>

Jones, J.H. & M. Salathe. 2009. *Early Assessment of Anxiety and Behavioral Response to Novel Swine-Origin Influenza A (H1N1).* 4(12), 2–9. <https://doi.org/10.1371/journal.pone.0008032>

Karasneh, R., S. Al-Azzam, S. Mu, O. Soudah & S. Hawamdeh. 2020. "Media's Effect on Shaping Knowledge, Awareness Risk Perceptions and Communication Practices of Pandemic COVID-19 among Pharmacists." *Research in Social and Administrative Pharmacy*, April. <https://doi.org/10.1016/j.sapharm.2020.04.027>

Kasperson, E.R. & X.J. Kasperson. 1996. "The Social Amplification and Attenuation of Risk." *Annals of the American Academy of Political and Social Science*, 545, 95–105. <http://www.jstor.org/stable/1047896>

Khosravi, M. 2020. "Perceived Risk of COVID-19 Pandemic: The Role of Public Worry and Trust." *Electronic Journal of General Medicine*, 17(4). <https://doi.org/10.29333/ejgm/7856>

Kim, J. & H. Bang. 2016. "Three Common Misuses of P Values." *HHS Public Access*, 7(3), 73–80. <https://doi.org/10.4103/2155-8213.190481.Three>

Lee, M. & M. You. 2020. "Psychological and Behavioral Responses in South Korea During the Early Stages of Coronavirus Disease 2019 (COVID-19)." *International Journal of Environmental Research and Public Health*, 17(9), 2977. <https://doi.org/10.3390/ijerph17092977>

Liao, Q., P. Wu, W. Wing, T. Lam & B.J. Cowling. 2018. "Trajectories of Public Psycho-Behavioural Responses Relating to Influenza A (H7N9) over the Winter of 2014-15 in Hong Kong." *Psychology & Health*, 0(0), 1–18. <https://doi.org/10.1080/08870446.2018.1515436>

- Limaye, R.J., M. Sauer, J. Ali, J. Bernstein, B. Wahl, A. Barnhill & A. Labrique. 2020. "Comment Building Trust while Influencing Online COVID-19 Content in the Social Media World." *The Lancet*, 2019(20), 2019–2020. [https://doi.org/10.1016/S2589-7500\(20\)30084-4](https://doi.org/10.1016/S2589-7500(20)30084-4)
- Lindell, M.K. & S.N. Hwang. 2008. *Households' Perceived Personal Risk and Responses in a Multihazard Environment*. 28(2). <https://doi.org/10.1111/j.1539-6924.2008.01032.x>
- Lorenzo-Seva, U. & P.J. Ferrando. 2014. *POLYMAT-C: A Comprehensive SPSS Program for Computing the Polychoric Correlation Matrix*. <https://doi.org/10.3758/s13428-014-0511-x>
- Luu, T. & D. Huynh. 2020. "The COVID-19 Risk Perception: A Survey on Socioeconomics and Media Attention." *Economics Bulletin*, 40(1), 758–764.
- Ma, T., A. Heywood & C.R. Macintyre. 2020. "Travel Health Risk Perceptions of Chinese International Students in Australia." *Infection, Disease & Health*. <https://doi.org/10.1016/j.idh.2020.03.002>
- Marshall, T. 2020. "Risk Perception and Safety Culture: Tools for Improving the Implementation of Disaster Risk Reduction Strategies Abstract." *International Journal of Disaster Risk Reduction*, 101557. <https://doi.org/10.1016/j.ijdr.2020.101557>
- Mian, A. & S. Khan. 2020. "Coronavirus: The Spread of Misinformation." *BMC Medicine*, 18(1), 89. <https://doi.org/10.1186/s12916-020-01556-3>
- Mwiya, B.M.K., Y. Wang, B. Kaulungombe & M. Kayekesi. 2019. "Exploring Entrepreneurial Intention's Mediating Role in the Relationship Between Self-Efficacy and Nascent Behaviour: Evidence from Zambia, Africa." *Journal of Small Business and Enterprise Development*, 26(4), 466–485. <https://doi.org/10.1108/JSBED-03-2017-0083>
- Okello, C.B.G. & J. Ntayi. 2019. "Trust: Mediator Between Mobile Money Adoption and Usage and Financial Inclusion." *Social Responsibility Journal*, July. <https://doi.org/10.1108/SRJ-01-2019-0011>
- Osborne, J., F. Fidler, G. Cumming & Others. 2008. *Best Practices in Quantitative Data Analysis*. Sage Publications.
- Pallant, J. 2011. *SPSS Survival Manual* (4th ed.). Allen and Unwin.

Preacher, K.J. & A.F. Hayes. 2008. "Asymptotic and Resampling Strategies for Assessing and Comparing Indirect Effects in Multiple Mediator Models." *Behavior Research Methods*, 40(3), 879–891. <https://doi.org/10.3758/BRM.40.3.879>

Ramadhan, M., M. Gilbert, J. Peter & K. Margret. 2017. *Determinants of mobile money services adoption by traders in Uganda*. 4(8), 189–201. <http://www.allsubjectjournal.com/download/3455/4-7-175-501.pdf>

Renn, O. & D. Levine. 1991. "Credibility and Trust in Risk Communication." In: *Communicating Risks to the Public* (pp. 175–217). Springer Netherlands. https://doi.org/10.1007/978-94-009-1952-5_10

Reynolds, B. & M.W. Seeger. 2007. *Crisis and Emergency Risk Communication as an Integrative Model*. 0730. <https://doi.org/10.1080/10810730590904571>

Rogers, R. W. 1975. "A Protection Motivation Theory of Fear Appeals and Attitude Change." *The Journal of The Psychology*, 91(1), 93–114. <https://doi.org/10.1080/00223980.1975.9915803>

Samir, A., A. Zeinab, M. Maha, E. Ibrahim, H.H. Ziady & M. Alorabi. 2020. "Knowledge, Perceptions, and Attitude of Egyptians Towards the Novel Coronavirus Disease (COVID-19)." *Journal of Community Health*. <https://doi.org/10.1007/s10900-020-00827-7>

Scherer, C.W. & H. Cho. 2003. "A Social Network Contagion Theory of Risk Perception." *Risk Analysis*, 23(2).

Shabu, S., M.K. Amen, K. Mahmood & N.P. Shabila. 2020. "Risk Perception and Behavioral Response to COVID-19 in Iraqi Kurdistan Region." *BMC Infectious Disease*, 1–23. <https://doi.org/10.21203/rs.3.rs-22025/v1>

Siegrist, M., T.C. Earle & H. Gutscher. 2003. "Test of a Trust and Confidence Model in the Applied Context of Electromagnetic Field (EMF) Risks." *Risk Analysis*, 23(4), 705–716. <https://doi.org/10.1111/1539-6924.00349>

Strong, C. & T. Ansons. 2020. *Responding to Covid 19: The Importance of Understanding How We Evaluate Risk*. <https://www.ipsos.com/sites/default/files/covid-19-risk-perception.pdf>

Tandi, T.E., K. Kim, Y. Cho, J.W. Choi, T. Erick, K. Kim. 2018. "Public Health Concerns, Risk Perception and Information Sources in Cameroon." *Cogent Medicine*, 56(1). <https://doi.org/10.1080/2331205X.2018.1453005>

Weerd, W. Van Der, D.R.M. Timmermans, D.J.M.A. Beaujean & J. Oudhoff. 2011. *Monitoring the Level of Government Trust, Risk Perception and Intention of the General Public to Adopt Protective Measures During the Influenza A (H1N1) Pandemic in the Netherlands*. <https://doi.org/10.1186/1471-2458-11-575>

Wong, L.P. & I. Sam. 2011. *Knowledge and Attitudes in Regard to Pandemic Influenza A (H1N1) in a Multiethnic Community of Malaysia*. 112–121. <https://doi.org/10.1007/s12529-010-9114-9>

World Economic Forum. 2019. *Outbreak Readiness and Business Impact Protecting Lives and Livelihoods Across the Global Economy* (January).

World Health Organisation. 2017. *Vaccination and Trust*. <http://www.asset-scienceinsociety.eu/pages/vaccination-and-trust-how-concerns-arise-and-role-communication-mitigating-crises>

World Health Organisation. 2020. *Survey Tool and Guidance: Rapid, Simple, Flexible Behavioural Insights on COVID-19* <https://www.euro.who.int>

Xu, J. & Z. Peng. 2015. *People at Risk of Influenza Pandemics: The Evolution of Perception and Behavior*. 1–14. <https://doi.org/10.1371/journal.pone.0144868>

Zeeland, E. Van. 2018. *The Behavioural Response of the Professional Buyer on Social Cues from the Vendor and how to Measure it*. 1(March 2017), 72–83. <https://doi.org/10.1108/JBIM-06-2016-0135>