The Effects of Socioeconomic Status and Risk Beliefs on COVID-19 Preventive Behaviour

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Abstract

Although the COVID-19 pandemic is no longer a global emergency of great concern according to the WHO, the effects remain. It is evident that the pandemic has not affected everyone equally, and only comparing national health policies does not paint the entire picture. Understanding why people chose or chose not to take action to prevent the spread of the virus is crucial for future health policymaking so that people can be empowered to avoid illness. Using the Social Determinants of Health as a theoretical framework, this study examines the effects of socioeconomic status and belief in one's risk of contracting COVID-19 on the prevalence of preventive behaviour. Secondary data from the Young Lives project, a longitudinal study exploring the effects of poverty upon young people, was used, and the respondents came from Peru, Ethiopia, Vietnam, and India. In order to answer the research questions, ordinal logistic regression was performed in two separate analyses. In the first analysis with only the main three variables, socioeconomic status had a small but statistically significant effect on preventive behaviour, but risk belief had no statistically significant effect. In the second analysis with the addition of control variables, socioeconomic status had a slightly larger effect, and risk beliefs had no effect. Not all of the control variables had a statistically significant effect on preventive behaviour, but the second model as a whole was stronger than the first model. In spite of limitations, this study has implications for future research and policymaking. Health policy should focus on helping people to improve the conditions in which they live so that they are able to make better choices for their health.

List of abbreviations

IBM SPSS – International Business Machines Statistical Package for the Social Sciences

IWI – International Wealth Index

TVET – Technical-Vocational Education and Training

WHO – World Health Organization

Introduction

The pandemic-causing COVID-19 virus was declared a global public health emergency by the World Health Organization (WHO) in 2020, and this status was lifted in 2023 (WHO, 2023). Within this time period, governments and health authorities around the world took different approaches to managing the spread of the virus. These policies resulted in different health outcomes, which can be measured in ways such as death rates, occupied hospital beds, vaccination rates, etc. However, it is important to look beyond the policies themselves to understand how and why certain groups within a population have different health outcomes. One could gather insight from behavioural psychology, the efficacy of government communication efforts, social inequality, pre-existing health conditions, risk tolerance, etc. in order to better understand why some people are more likely to follow public health guidelines than others. The possible contributing factors are too numerous to contain within a single study.

Nevertheless, the concept of health-related behaviour warrants extensive study and analysis because understanding it aids health policymakers and communicators in ensuring that people take necessary action to stay healthy. This concept is a rather broad one, and some studies use it to refer to activities such as sleep habits and alcohol consumption, which can be studies as overall causes of (mental or physical) health and wellbeing (Arora & Grey, 2020). Other studies look at how certain health behaviours affect or cause specific health conditions (Eriksen et al., 2015; Holtgrave & Crosby, 2003). Health behaviour can be difficult to study since researchers often rely on self-reporting from participants, which is not always accurate; however, behaviour directly observed by researchers also comes with a set of problems (Conner & Norman, 2017). This study uses the concept of preventative behaviour in the context of COVID-19, and in this context, it refers to actions that people may choose to take in order to prevent contracting or spreading the virus. The specifics of these behaviours will be discussed later.

One of the possible drivers of preventative behaviour is the degree to which people believe they are at risk of having a certain health problem, a concept that will henceforth be referred to as risk belief. In some cases, this is tied to whether or not people believe that a certain health risk is real. Risk belief is generally studied in terms of specific health concerns, and it is often framed in terms of the Health Belief Model, which proposes that people take

action to prevent health issues based on perceived severity and susceptibility (Ellithorpe et al., 2022). Multiple studies have demonstrated links between beliefs in COVID-19-related conspiracy theories and a decreased likelihood to adopt preventative behaviours (Allington et al., 2020; van Mulukom et al., 2022; Kowalski et al., 2020).

Another possible driver of preventative behaviour is how well-off people are. This is often referred to in the literature as socioeconomic status, which is a concept that is usually presented in the form of income, material assets, educational attainment, and/or employment status (Algren et al., 2020; Darin-Mattsson et al., 2017; Mayfourd & Hruschka, 2022). It can be difficult to compare groups in different countries with different socio-political or economic contexts since markers of high or low socioeconomic status may be different in each place (Poirier et al., 2020), and poverty can be considered to be relative instead of absolute (Decerf, 2021). In research involving people in developing countries, many academics tend to use material wealth as an indicator of socioeconomic status since it tends to be easier to measure, especially when there is a need to make international comparisons (Briones, 2017).

This study examines risk beliefs and socioeconomic status as possible drivers of preventive behaviour, which provides a broader, more nuanced perspective than only looking at psychological causes, as plenty of existing research has already done. Socioeconomic status is a concept that demonstrates something about an individual's life and means within the context of their broader community. Risk beliefs, on the other hand, are much more individual. Including both of these elements in a study on preventive behaviour provides a more complete view on why people act the way they do, which in turn can give insight for health-related policymaking.

The aim of this study is not to victim-blame, but rather to better understand why people make certain choices with regards to their health. Understanding these choices aids policymaking because it allows policymakers to strive for changes in the conditions that facilitate certain types of decision-making, which in turn enables people to make choices that benefit their health. This falls in line with the concept of health promotion, which is defined as "the process of enabling people to increase control over, and to improve, their health" (WHO, 1986). Applying the concept of health promotion is particularly important in developing countries as it allows research to ultimately lead to policy solutions that work in spite of underfunded healthcare systems. It is for this reason that this study will examine the effects of risk beliefs and socioeconomic status upon preventive behaviour in India, Vietnam, Peru, and Ethiopia.

Research Questions and Objective

The objective of this study is to examine the impact of socioeconomic status and COVID-19 risk-related beliefs on how often preventative behaviours are undertaken. This study uses secondary data from the Young Lives project, a longitudinal study examining the effects of poverty upon the lives of young people in developing countries. The countries used in this study are Vietnam, Peru, India, and Ethiopia. The following research questions sum up the aim of this study as a whole:

1. Does socioeconomic status impact COVID-19-related preventive behaviours?
2. Do beliefs concerning COVID-19 risk impact preventive behaviours?

Theoretical Framework

Several theories have been proposed to explain what impacts health-related behaviours. Generally, they can be divided between those that take a more psychological approach (Social Cognitive Theory, Theory of Planned Behaviour, Health Belief Model, etc.) and those that adopt a wider viewpoint overviewing the conditions in which people live (Social Determinants of Health, Social Ecological Model, etc.) (Lin & Chang, 2018; Wan et al., 2022; Ellithorpe et al., 2022; WHO, 2022; Eriksson et al., 2018). As discussed in the introduction, the elements studied here cover both individualistic and broad features, meaning that any one of the aforementioned theories could be used. However, the information available in the source dataset (see the Methods chapter for more details) gives a robust overview of the participants' socioeconomic context and offers very little regarding more individualistic factors such as self-efficacy or social interactions. It is for this reason that this study will be framed in terms of the Social Determinants of Health.

The Social Determinants of Health is defined by the World Health Organization (WHO) as "the conditions in which people are born, grow, work, live, and age and people's access to power, money and resources" (WHO, 2022). The Social Determinants of Health bring analysis beyond the cause of diseases (e.g., poor diet leading to high cholesterol that contributes to cardiovascular disease), instead looking at the "causes of the causes" (e.g., poverty leading to a cheap, unhealthy diet that ultimately contributes to cardiovascular disease) (Marmot & Wilkinson, 2005, p.2). The implication of this framework is that health is placed within the context of a person's environment, meaning that improving that environment can improve a person's health. This is tied to the normative agenda that the WHO advocates for in regards to the Social Determinants of Health, calling for improvement in people's lives and environments that will in turn positively impact health (WHO, 2008). Another implication of this framework is the acknowledgement that individuals are not entirely at fault for making poor health-related choices.

In terms of COVID-19, previous research has already involved the Social Determinants of Health as a framework of analysis. They have been used to explain why certain groups of people are less able to follow certain health-related guidelines such as social distancing mandates (Abrams & Szefler, 2020). Some research has also demonstrated that COVID-19 has negatively affected health determinants such as income, increasing health-

related inequality (Green et al., 2021; Cheater, 2020). One study pointed out that addressing the social determinants of health in developing countries could help reduce the burden placed upon weaker or underfunded healthcare systems during the pandemic (O. Ataguba & J. Ataguba, 2020). All in all, the existing literature suggests that the Social Determinants of Health provide a useful framework for examining issues related to COVID-19.

Literature Review

Ever since the outbreak of the COVID-19 virus in late 2019 and its subsequent worldwide spread in 2020 (Dagba et al., 2021), questions on its effects, spread, and prevention have occupied the work of researchers across various fields. Despite its prominent presence in academia, the news, and everyday conversations, literature gaps still exist, and this chapter will point out the one to be addressed by this study. Even though COVID-19 is no longer classified as a global emergency by the WHO (WHO, 2023), further research on how the virus has impacted the world can be applied to other contexts as well as potential future global crises. In the specific case of this study, understanding the impact of risk beliefs and socioeconomic status on preventive behaviours can be applied to other health-related contexts at the very least. Understanding why people act the way they do is important because it can aid in developing new health-promoting policy strategies. As this literature review will discuss, similar research has already been done in regards to other diseases, and further research can be done both in the context of COVID-19 as well as other issues. Having an understanding of the issue at hand within the specific context of COVID-19 is particularly important due to the magnitude of the effect of this virus upon the world as opposed to illnesses such as Ebola that did not spread as far (Wilder-Smith, 2021). In addition, the conclusions that will be made in this study could also bring fresh insight onto the topics of poverty and inequality.

COVID-19 in the Literature

While reviewing the literature relevant to the research questions in this study, it appears that there has been very little work published on the relationship between COVID-19-related behaviour and socioeconomic status or poverty. The virus has been clearly linked to poverty in that poorer people have suffered more as a result of the pandemic overall (Patel et al., 2020; Ellanki et al., 2021). There are also some studies on COVID-19 and protective behaviour (actions taken to reduce risking the spread of the virus) (Alijanzadeh et al., 2021; Serpas and Ignacio, 2021; Clark et al., 2020) as well as risk tolerance (Guenther et al., 2021; Galandra et al., 2020), but these studies do not link that behaviour specifically to poverty and/or people's overall socioeconomic status. Also, this tends to be studied from a more psychological standpoint as opposed to only talking about physical health and comorbidities

(Yıldırım et al., 2020; Guenther et al., 2021; Nofal et al., 2020). Another commonly addressed aspect is the role of perceptions, beliefs, and misinformation in shaping how people act during the pandemic (Chen et al., 2020; Kebede et al., 2020; Lee et al., 2020).

A common thread among many of the studies that did examine COVID-19 and preventative behaviour was the inclusion of gender as an important variable (Yıldırım et al., 2020; Sun et al., 2020; Rodrigues-Besteiro et al., 2021). The general finding among these studies is that women tend to have less of a tolerance for risk and adopt more protective behaviours against COVID-19 as a result. One study proposed that the gender difference could alternatively be due to more women staying home, perhaps to take care of children or ill family members (Papageorge et al., 2021). Although gender is not examined in this study for reasons explained in the Methods chapter, it is still necessary to bring it up as an analytical component in past research in order to provide better recommendations for further research.

A few studies looked at other demographic variables in relation to preventive behaviours. One survey in Germany found that those with a lower level of education were less likely to engage in these behaviours (Lüdecke & von dem Knesebeck, 2020). Some other surveys looked at urban and rural differences in behaviour, finding that residents in urban areas were more likely to obey given preventive behaviour protocols (Callaghan et al., 2021; Nguyen et al., 2020).

Other Diseases in the Literature

Previous studies on diseases aside from COVID-19 have, however, explored correlations between aspects of socioeconomic status and protective behaviours. This research has been done in the context of sexually transmitted infections (STIs) (Holtgrave and Crosby, 2003), malaria (Berthélemy et al., 2013), the H1N1 virus (Bish and Michie, 2010), noncommunicable diseases (NCDs) (Pullar et al., 2018), et cetera. A recurring pattern among the studies cited above is that there tends to be a positive correlation between protective behaviours and socioeconomic status. The presence of such a pattern indicates that the same could be true within the context of COVID-19.

As the next section of the literature review will discuss, there are very few studies that analyse the effect of socioeconomic status upon COVID-19 protective behaviours; many existing studies turn the focus to pandemic-related job loss instead. The research on how socioeconomic status is linked to other diseases aside from COVID-19 is relevant to this

study since it gives a basis upon which the existing literature gap can be filled. Although there is an established precedent for a socioeconomic status variable, only the study by Pullar et al. (2018) includes an analysis of risk belief. It is also worth noting that none of these other diseases have had the same effect on modern society as COVID-19 in terms of temporarily shutting down much of the world and forcing sudden lifestyle changes.

Directly Relevant Literature

The searches done as a part of this literature review uncovered three articles that covered how socioeconomic status (or wealth) has determined behaviour during the pandemic. One of these used a broad, qualitative approach, examining how poverty impacted the overall compliance to lockdown measures in developing countries (Dagba et al., 2020). The general conclusion was that pre-existing conditions of poverty made many people unable to adopt all of the necessary protective behaviours with regards to COVID-19 (Dagba et al., 2020). Although this paper's approach is completely different from that of this study (broad and qualitative versus narrow and quantitative), its work presents a significant contribution to the topic at hand, which remains under-researched.

Another relevant paper took a quantitative approach to examining change over time in preventive behaviour between two surveys (Kollamparambil & Oyenubi, 2021). This study used socioeconomic status as an analytical tool in addition to risk perception and self-efficacy, finding that wealthy and educated respondents were more likely to engage in preventive behaviours (Kollamparambil & Oyenubi, 2021). Although the main focus of this study was not necessarily poverty or socioeconomic status (the main theoretical framework was the Health Belief Model), the authors did acknowledge the importance of wealth in the study, especially given the high level of inequality in South Africa (Kollamparambil & Oyenubi, 2021). The results of this study are significant within this niche of research since the respondents were not selected with a need to focus on poverty, meaning that more comparison between people of differing socioeconomic statuses is possible.

A quantitative study performed in the United States examined socioeconomic status, beliefs in the efficacy of prevention measures, whether or not remote work was possible, and other demographic variables as they relate to preventive behaviour (Papageorge, et al., 2021). Interestingly, this study found that even if people believed in the efficacy of preventive behaviours, they did not necessarily perform those behaviours due to socioeconomic status

and the inability to work remotely (Papageorge, et al., 2021). Even though this study covers a developed country, the results are still highly relevant to this study due to some of the variable similarities. Their belief variable focused on the perceived efficacy of preventive behaviours rather than personal risk tolerance, but this is still a key consideration to make as it somewhat reflects people's access to accurate public health information.

In addition to the paper mentioned above, there is one publication giving an overview of the findings of the three telephone surveys in 2020 done as a part of the Young Lives project, a longitudinal study of people in four countries whose data will form the backbone of this study. The data collected points to the conclusion that COVID-19 has had a greater effect upon poorer people, and that those people are often unable to adopt protective behaviours as recommended by their governments and/or by the World Health Organization (WHO) (Ellanki et al., 2021). Ellanki et al.'s paper gave a comprehensive overview of the health, mental wellbeing, and economic status of the participants. This study, on the other hand, will take a more specific approach by looking only at the relationship between risky COVID-19 behaviours and socioeconomic status, drawing in variables such as the parents' level of education, tolerance for risk, and beliefs regarding the virus in order to draw more nuanced conclusions. In other words, Ellanki et al. published a thoroughly-analysed report on the data from the 2020 Young Lives surveys, but there is still room for deeper examination of the topic of the research question mentioned above.

COVID-19 in Peru

A brief overview of the context of each country covered in this study is necessary in order to contextualise the results and the statistical differences between countries seen in the analysis. Peru was one of the most negatively-effected countries in Latin America in the first year of the pandemic (Munayco et al., 2020). Although strict preventative measures were taken by the government soon after the virus reached Peru, the growth of cases was still exponential (Munayco et al., 2020). This placed significant strain on the country's already weak and underfunded healthcare system (Schwalb & Seas, 2021). A generally low rate of health literacy, the spread of misinformation, and decentralised health policymaking exacerbated the situation (Alvarez-Risco et al., 2020; Schwalb & Seas, 2021). Poorer communities and already-marginalised indigenous communities suffered some of the worst mortality rates (Gianella et al., 2020).

COVID-19 in Ethiopia

Similar to Peru, the ability of the Ethiopian authorities to keep the virus under control was hampered by an underdeveloped and underfunded healthcare system (Ayenew et al., 2020). A lack of proper sanitation and quarantine space also made the situation worse (Ayenew et al., 2020; Habenom et al., 2022). Crowded living conditions and high use of public transportation were some of the main challenges faced by urban residents of Ethiopia (Habenom et al., 2020; Kifle & Obsu, 2020). In rural areas, rates of mask usage remained very low due to a lack of public awareness (Kifle & Obsu, 2022). Cultural and religious practices such as physical greetings, funeral attendance, and other cultural events increased the spread of COVID-19 (Habenom et al., 2022; Kifle & Obsu, 2022). All of these conditions occurred in spite of government efforts to inform the public, impose lockdowns, and restrict mass gatherings (Kifle & Obsu, 2022). The difficulties faced by Ethiopians in light of the pandemic fall within a context of high rates of poverty and political insecurity in parts of the country.

COVID-19 in India

In spite of government measures, India ended up being particularly hard-hit in 2020 (Aneja & Ahuja, 2021). Urban areas were the most affected, with challenges stemming from crowded living conditions and poverty (M et al., 2022; Shah et al., 2022). Underinvestment in the public healthcare system led to a lack of preparedness, and this can also be tied to a lack of trust in the healthcare system (Chetterje, 2020; Siddiqui et al., 2020). In spite of the government's efforts to impose lockdowns and social distancing, the virus continued to spread for reasons including large families living together and large gatherings of cultural value (Shah et al., 2022).

COVID-19 in Vietnam

The situation in Vietnam was vastly different from the other countries studied here. The government quickly shut down its border with China and set up symptom checks for travellers entering the country (Quach & Hoang, 2020). Schools, universities, and entertainment-related venues were shut down, and travel within the country was restricted (Quach & Hoang, 2020). The Vietnamese authorities were particularly adept at contact

tracing and health-related surveillance (Duong et al., 2020). This success occurred in spite of a healthcare system that was underfunded enough to create some health inequalities among the population (Trinh et al., 2022).

Methods

The aim of this chapter is to outline and give reasoning for the way in which this study was undertaken. The research methods, including sampling, design, analysis, data management, and ethics, will be presented and explained. All of this will be connected to the main research questions.

Study Design

This study uses secondary data analysis with a quantitative approach in order to answer the research questions at hand. It can be considered a cross-sectional study since the data used was collected within a relatively short period of time (Wang & Cheng, 2020). Although the data comes from a longitudinal study, this study only uses variables from one survey because its goals do not include examining change over time or establishing cause and effect. Cross-sectional studies have been useful in health-related research for analysing disease-related behaviour and attitudes, which points to their relevance to the research questions at hand (Kesmodel, 2018). Since cross sectional studies do not indicate consistency of results over time, they should not be used to make causal inferences (Carlson & Morrison, 2009).

Dataset

The dataset for this study comes from the Young Lives project, a longitudinal mixed methods study examining youth and poverty in India (specifically within the states of Telangana and Andhra Pradesh), Vietnam, Ethiopia, and Peru. The Young Lives project began in 2002 with the older cohort aged around 7 to 8 and the younger cohort at around 1 year of age (Favara et al., 2022). At the outset of the study, around 12,000 children were in the study, but this number dropped to 10,496 by 2020 (Young Lives, 2020). Of those participants, 4,559 completed the specific phone survey referenced in this study to varying degrees. This phone survey was the second completed by the Young Lives project in 2020, and the data was collected between August and October of 2020. The overall project is the result of international efforts and funding, but it has mainly been led by the University of Oxford. The information collected covers various aspects of the lives of the individual

children, their parents, and their communities as a whole, allowing insight into the effects of generational poverty and change over time (Favara et al., 2022).

Sampling

The sampling procedures of the Young Lives project were partially purposive since the main focus is poverty. In the four studied countries, 80 rural and urban sites were selected with the central focus in mind, which is called sentinel site sampling (Boyden et al., 2021). Then, the children were randomly selected within those sites, with the exclusion criterion being age (Kumra, 2008). Most of the respondents grew up in poverty, but some outside of this selective criterion were included into the study in order to make comparisons (Harpham, 2002). Because of the skewed representation of poverty in the Young Lives project, the demographics of the respondents are not entirely representative of the countries studied, but they could be comparable to impoverished areas of other developing countries (Boyden et al., 2021).

This study did not make any exclusions beyond any made by the Young Lives project. The dataset used is from only one of the phone surveys done in 2020, meaning that the participants are the ones who took part in that particular survey. The phone surveys from 2020 were arguably less inclusive than the in-person surveying done for most of the Young Lives project. This, combined with the attrition rate of the overall project, means that the number of participants in this study is far less than the original number of participants (10,496 at the beginning of 2020). The total number of participants in the dataset for the second phone call, which is the sample size of this study, is 4,559.

Within the statistical analyses, the sample sizes were lower than the number stated above. Model 1 included data from 1,355 respondents, and Model 2 included data from 602 participants. This is because participants who either refrained from answering or stated that they did not know the answer to a certain question were assigned missing values. This means that if a participant had a missing value in one of the questions that was a component of one of the scales, then they would have a missing value for the scale variable. In prioritising precision, this study sacrificed having higher *n* values. This trade-off will be further discussed in the Discussion chapter.

Data Collection and Storage Methods

As mentioned previously, the specific survey used in this study was done via a phone call. The staff involved in collecting the data in all four countries were provided with the necessary equipment to contact the participants and record the data if they did not already own such equipment (smartphones, phone plans, SIM cards, participants contact information, survey forms, etc.) (Young Lives, 2022). A detailed set of protocols were given to the data collecting staff regarding dealing with technical issues, getting in touch with participants, ethical considerations, and the project timeline (Young Lives, 2022).

For the purpose of this specific study, the data from the second Young Lives phone survey of 2020 was acquired via the website for the UK Data Service. The researcher had to establish an account on this website, including an explanation of how the data would be used. Once the account and login credentials were established, the researcher was able to download the data. The data was kept on a personal, password-protected computer that remained solely in the possession and use of the researcher for the duration of the study. A backup copy of the data was stored on a password-protected Microsoft OneDrive account. After the completion of the study, all of the data was deleted.

Statistical Analyses

All of the statistical analyses were performed in IMB SPSS Statistics. First, descriptive statistics were performed. Frequencies of all of the variables were presented, and then further information on the main dependent and independent variables was presented. Since the behaviour and belief variables are ordinal scales, their frequency distributions were presented. Since the behaviour scale was constructed from seven questions from the survey, reliability was confirmed via Cronbach's alpha and an inter-item correlation confirmed a lack of redundancy within the scale. Because the socioeconomic status variable is continuous, the range, minimum, maximum, standard deviation, skewness, kurtosis, and normality were assessed.

Next, the ordinal logistic regression analysis was performed two times. The assumptions were checked first. The first analysis made a model with only the main independent variables (beliefs and socioeconomic status) and the dependent variable (behaviour). Then, a second model was made with all of the aforementioned variables in addition to six control variables, which will be detailed later in this chapter.

Ordinal logistic regression was chosen as the appropriate type of analysis for this study because it requires an ordinal dependent variable (Tabachnick & Fidell, 2014). This type of analysis also does not require normality of any of the variables (Tabachnick & Fidell, 2014), and its assumptions were ones that could be met by the dataset in use in this study (see the results chapter for a more detailed explanation of assumptions). Ordinal logistic regression was chosen as the analysis method after the variables and research questions were selected.

Variables

Independent Variables

There are two main independent variables referenced in the research questions, namely COVID-19-related beliefs and socioeconomic status. Their formulation came about more so on the basis of data availability rather than being specifically formulated based on trends and tendencies in the literature. The beliefs variable is based on a single question in the survey, which is why there was no need for much consultation of existing literature on how to formulate it. The socioeconomic status variable is a scale variable based on a number of questions that were carefully selected, weighted, and combined based on a previous measure.

As mentioned above, the beliefs variable is based on a single question in the survey, which asks participants about their expected/perceived risk of contracting COVID-19. The possible valid answers to this question are no risk, low, medium, and high. The possible response "not known" was eliminated from the analysis and was treated as a missing value for those respondents. In order to construct this variable, the valid answers were treated as items on a scale, resulting in an ordinal scale with four points.

The variable measuring socioeconomic status was much more complex. The concept of socioeconomic status is complex, and the way that it is measured varies. Material wealth is part of what comprises socioeconomic status, and it has been employed as a certain way to measure and indicate socioeconomic status (Mayfour & Hruschka, 2022). Using material wealth as a measure is both feasible and useful in developing countries due to it being a relatively reliable and valid measure that can be done at a lower cost than other alternatives (Kaiser et al., 2016). The downside to this is that elements such as social capital and education are not considered (Mayfour & Hruschka, 2022). Social capital is not included as a

measure in the Young Lives project, and educational attainment is a separate variable in this study. Keeping variables from becoming too complicated allows the research to separate the effects of each independent variable on the dependent variable, which is why more elements of socioeconomic status are not combined into one variable alongside material wealth in this study.

A wealth index was created specifically for use within the Young Lives project, but it has different country-based measures and thus cannot be used to compare people living in different countries (Briones, 2017). This index was not used for this study since the aim of this study is to make comparisons that are not restricted by borders. Ultimately, the International Wealth Index (IWI) was chosen as the basis for the basis of this variable. This index was specifically designed to allow comparison in wealth between people in different developing countries as well as at different points in time (Smits and Steendijk, 2015). This type of comparison is made possible by the fact that the index looks at aspects of asset-based wealth that is valued by people living almost anywhere, as opposed to monetary wealth or location-specific measures of wealth (Smits and Steendijk, 2015). The available literature presents a relatively positive view of the IWI, and it has been widely used (Woolard et al., 2022; Mayfour & Hruschka, 2022).

The variable based upon the IWI did not include all of the elements of the original IWI due to some of the information being missing from the source survey. The elements of the original IWI can be divided into the categories of consumer durables (respondents are asked whether or not they have these), housing characteristics (quality is measured on a three-point scale), and public utilities (one is answered as have or have not and the other is measured on a three-point quality scale). The consumer durables are television, refrigerator, car, phone, bicycle, cheap utensil, and expensive utensil. A cheap utensil is defined as being a household item that can be valued at under around 50 US Dollars (Smits and Steendijk, 2015). This could be a table, chair, or clock, to name a few examples. The expensive utensil refers to something owned by a household that is valued over roughly 250 US Dollars; this can be a car, large kitchen appliance, a computer, etc. (Smits and Steendijk, 2015). It is assumed that a household in possession of an expensive utensil also has a cheap one, so this was factored into how the IWI variable was coded in this study. The elements missing from the Young Lives survey and thus from this study were refrigerator, car, bicycle, and floor material. The floor material element was replaced by other house construction elements found in the Young Lives survey in order to keep the wealth index as intact as possible. Questions asking about whether or not the participants' houses had a roof and whether or not

they had walls on all sides of the house were combined to form an element with three possible response categories: none, one, or both of the described house features.

Even with three missing elements, scores calculated on the IWI scale can still be quite accurate, and score differences with missing elements is detailed in Smits and Steendijk's article on the scale (2015). The scores can be calculated with either a formula or with SPSS syntax. This syntax was acquired via download on Global Data Lab's website, which required the creation of a login. The original syntax was altered to account for the names of variables that already existed within the Young Lives dataset as well as the new variables created out of existing data for the sake of this study. Only two elements from the original IWI scale did not need to be recoded within SPSS, and those were access to electricity and television. The creation of the expensive utensil variable was somewhat problematic because the only relevant question within the Young Lives survey was the one asking participants if they had internet access via a computer. A computer would be clearly classified as an expensive utensil, but it could be possible that some participants have a computer without internet access or another expensive utensil. The cheap utensil variable was problematic for the same reason, and it was equated with a question asking participants if they had a radio. Although the formulation of these variable elements of the scale could raise some red flags, the resulting distribution of IWI scores among the respondents are quite skewed to the high end of the scale (see the descriptive statistics subsection of the results chapter), meaning that far more participants had a relatively high score as opposed to a low score. This suggests that the somewhat restrictive nature of the expensive and cheap utensil questions did not prevent a large number of high scores on the scale.

Aside from the variable elements of the scale mentioned above, the rest had to be coded by the researcher to be inserted into the IWI scale calculations. For the elements of the scale that operate on a three-point quality scale, the answers to equivalent survey questions had to be recoded according to the standards set by the creators of IWI. For example, the question in the Young Lives survey asking about what kind of water source the participants' households have has 16 possible answers that needed to be sorted into the three categories of quality (low, medium, and high) according to the criteria set by the creators of the IWI. The Young Lives survey responses differentiate between having access to a public bore well versus having a privately-owned bore well, but these both fit into the high-quality category in the IWI.

Once the IWI scale variable was created with the downloaded syntax, a score was assigned to every participant who answered all of the necessary questions in the original

survey. Those with missing responses for one or more questions were not assigned a score. The researcher chose not to perform any internal scale reliability tests on the modified version of the IWI due to it already being a well-tested construct (Smits & Steendijk, 2015; Woolard et al., 2022).

Dependent Variable

The dependent variable in this study is a scale based on how often the participants undertook certain COVID-19-related preventive behaviours. The scale consists of seven questions from the source survey asking about the following behaviours: washing hands more often than before, avoiding handshakes/physical greetings, avoiding group meetings, wearing a facemask when outside, wearing gloves when outside, keeping a distance of at least 1-2 meters from other people, and wearing a face shield/protector when outside. Each question had the following three possible responses: never, sometimes, and always. To create the scale, an average of all seven scores was calculated in order to give each participant their final score.

Control Variables

A number of control variables were selected based on their availability within the source survey and their ability to provide a more specific picture of the sample demographics. Since only two age groups are represented in the Young Lives project, a variable denoting the cohort group was created. A variable denoting each participant's country of residence was also created for the purpose of this study. The cohort and country variables had to be constructed for this study because they do not exist in the original source data. This is because the data was separated into 8 separate files when downloaded; each age cohort within each country has its own file, meaning that the researcher had to merge them all into one in order to conduct the majority of the research. These variables were included in this study because they represent key pieces of demographic information that describe the sample.

A new, categorical variable describing educational attainment was also created for the purpose of this study. A question on the source survey asks about the highest form of education completed by the respondents, but the high number of possible answer categories (32) led the researcher to condense them into 8 distinct categories in order to simplify the statistical analysis and give a higher sample number to each category. The answer categories of "not known" and "not answered" from the source survey were converted to missing

values. This variable was included in the survey because it is another key piece of demographic information. As previously mentioned in this chapter, educational attainment can be considered to be a part of socioeconomic status, meaning that this information may provide increased insight into the results.

A new, categorical employment status variable was created by merging the responses to two relevant variables from the source data. One original survey question asked the participants if they had worked at least one hour in the past week for themselves, a household member, or an employer. Another question asked those who had not worked in the past week if they still had a job in spite of not working within the past week. If respondents answered yes to one of these questions, then they are considered employed for the purpose of this study. This variable was included into the study for the same reasons previously mentioned for the other control variables.

A categorical area of residence variable specifying whether participants live in a rural or urban area was included as well. The inclusion of such a variable is crucial not only for demographics purposes, but also for understanding the respondents' ability to adopt preventive behaviours. For example, a person living in an urban area with a high population density may have found it more difficult to maintain proper social distancing than someone living in a sparsely-populated rural area.

One question from the original survey asking the respondents how wealthy they perceived themselves to be was also included in this study. The responses were on a five-point ordinal scale ranging from destitute to very rich. This variable was added to the analysis for exploratory purposes in case it captured something that the IWI scale failed to accurately report.

Omitted Variables

One commonly-employed piece of demographic information that is absent from this study is gender. Although the use of such a variable could lead to new insights, it was omitted simply because this question was not asked in the survey used for this study. It was reported in a different Young Lives phone survey for 2020, but the purpose of not merging this information into the data files for the specific survey used was to avoid any problems arising from inconsistencies between datasets.

Ethical Considerations

The overall Young Lives project follows ethical considerations set by the University of Oxford as well as by ethical governing bodies in each of the participating countries (Young Lives, 2022). Some key features of the ethical principles behind this project are sensitivity towards the participants and their living situations as well as informed consent (Morrow, 2013). Privacy is also key; the data is anonymised and no photographs of the participants can be used in any Young Lives publication or webpage (Morrow, 2013).

Most of the initial ethical considerations were covered by those creating and undertaking the Young Lives project, but some of these considerations extend to the secondary use of the data in this study. The terms and conditions set out by the UK Data service stipulate that the data must be properly secured, kept anonymous, not shared to third parties, and used only for the purpose of not-for-profit research. As mentioned previously, the researcher kept the data secure. No individual participants have been singled out in the process of this study, meaning that anonymity has been maintained. The purpose of this study as it relates to examining the effects of poverty on health-related behaviour aligns with the mission of the Young Lives project, which is to offer insights on poverty that aim to inform policymaking.

Quality Assurance

There are three main types of quality assurance within quantitative research, which are validity, reliability, and generalisability. Reliability refers to consistency both internally and over time (Punch, 2014). Validity refers to ensuring that the researcher is measuring what they intend to measure (Punch, 2014). Generalisability is whether or not the methods and results of a study can be applied to other studies (Punch, 2014). In order to ensure that the behaviour scale created for this study measure what it was intended to measure (validity), an inter-item correlation matrix was generated within SPSS, and this is covered in the results chapter. This was not done for the IWI scale because previous research has established the validity of this scale in multiple contexts (Smits & Steendijk, 2015). Internal reliability was checked by obtaining Cronbach's Alpha. Reliability over time can be ensured in several different ways employed within this study. First, the survey upon which this study is based was piloted on some non-participants before being used with the official Young Lives participants (Young Lives, 2022). Also, the scale variable used in this study to assess wealth

(which will be presented later in this chapter) is a modified version of a widely-used and studied wealth-measuring scale.

Generalisability is not as simple to assess as the other indicators of quality within quantitative research. There is an assumption among plenty of quantitative research that their samples represent the broader population and are therefore generalisable (Punch, 2014). I would argue that this should not be assumed and that the concept of generalisability should be assessed critically. The fact that we have data from different communities within four different countries could suggest that the same methods of analysis can be extrapolated to different countries and contexts (assuming that other surveys asked the same questions). The only issue with this is that wealthier countries sometimes face different (or fewer) challenges than developing countries such as the ones. The questions in the surveys from Young Lives are geared towards studying poverty, indicating a degree of bias. Therefore, the results of this study will not be completely generalisable.

If the concept of generalisability is narrowed in order to only be inclusive of other poor communities within other developing countries, then one could consider this study to be partially generalisable. The questions from the Young Lives survey used in this study were the same across all four studied countries. If these questions are general enough to be used across different cultural and geographic contexts, then they could arguably be used in similar contexts in other countries. Also, the wealth scale that will be introduced later in this chapter was made with the purpose of being applicable to a wide variety of contexts within developing countries, thus allowing for wealth comparisons that transcend nationality and currency. In this sense, the results and methods of this study could be applicable in other communities in developing countries. However, the small sample size (n=602) in the second ordinal logistic regression analysis places a limit on the generalisability of the study as a whole.

Results

This chapter presents the results of an ordinal logistic regression analysis that seeks to answer the following research questions:

1. Does socioeconomic status impact COVID-19-related preventative behaviours?

2. Do COVID-19-related beliefs impact preventative behaviours?

First, descriptive statistics are presented both for the survey respondents as a whole and for each of the relevant variables. The analysis is split into two main models. The first model has preventative behaviour as the dependent variable and socioeconomic status (in the form of the IWI scale) and beliefs as the only independent variables. The second model includes all of the aforementioned variables with the addition of five additional independent variables. The assumptions for both models are presented in one section of this chapter, and the analyses are separated into two separate sections at the end.

Descriptive Statistics

Study Sample Overview

The overall sample size was 4,559. The respondents lived in Vietnam (7.3%, n=332), Peru (27%, n=1229), Ethiopia (54.1%, n=2467), and India (11.6%, n=531). They were divided into two age-based cohorts, with the older being 26 years old at the time of surveying (n=1627, 35.7%) and the younger being 19 years old (n=2932, 64.3%). Of the respondents who gave information on their location, 42.8% (n=856) lived in rural areas, and 57.2% (n=1146) lived in urban areas. The majority of the respondents who reported their level of completed education had completed secondary school (n=470, 46.4%). 350 (34.6%) respondents had been educated up through primary school, while 2 respondents (.2%) had not received a primary school education. 130 respondents (12.8%) held a non-degree teaching certificate, and 26 respondents (2.6%) held a Technical-Vocational Education and Training (TVET) certificate. 34 participants (3.4%) had an undergraduate degree, and 2 participants (.2%) had attained a Master's degree or doctorate. Of the participants who gave information

on their employment status, 376 (27.4%) reported being unemployed, and 996 (72.6%) reported being employed.

IWI Scale Variable

In this study, socioeconomic status is measured with a modified version of the IWI scale, as explained in the previous chapter. This study has information from 1989 respondents regarding where they fall on the IWI scale. As the table below indicates, the lowest IWI score in this study is 20.87, and the highest is 100. This reflects that the participants in this study fall along the full length of the original, unmodified IWI scale, which ranges from scores 25 to 100. The IWI scores in this study had a mean value of 69.22, with a standard deviation of 15.21. The skewness value shown in the chart below indicates that the scores are skewed towards the higher (wealthier) end of the scale. The kurtosis value indicates that the distribution is more peaked than flattened.

Descriptive Statistics

						Skewness		Kurtosis	
	N	Min.	Max.	Mean	Std. Deviation	Statistic	Std. Error	Statistic	Sd. Error
IWI	1989	20.87	100	69.22	15.21	-0.473	0.055	-0.311	0.11

Table 1: Descriptive statistics for the IWI variable

The histogram below provides a visualisation for the distribution of IWI scores. The skew of the distribution is visible, and it is evident that the distribution of scores is not normal. The ordinal logistic regression analysis does not require normality of independent variables, so no assumptions have been violated on the basis of normality.

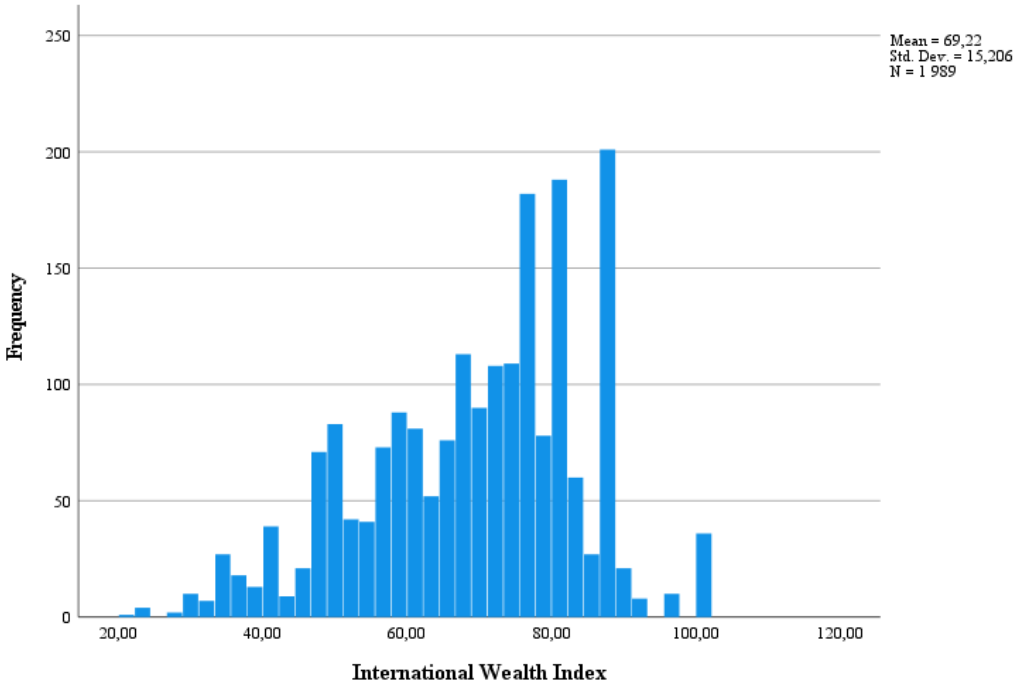

Figure 1: Histogram of the IWI variable

COVID-19 Preventative Behaviour

The preventative behaviour scale is an ordinal variable ranging from 0 to 2. It is based on seven variables that record information on how often the participants engage in certain behaviours aimed at reducing the spread of COVID-19. Those variables are ordinal and are coded on a three-point scale with the following values: 0) Never; 1) Sometimes; 3) Always. The variables within the preventative behaviour scale measure the frequency of the following behaviours: washing hands with soap more often than before, avoiding handshakes and physical greetings, avoiding physical gatherings, wearing a facemask when outside, wearing gloves when outside, keeping a distance of at least 1-2 meters from others, and wearing a face shield or protector when outside.

Before proceeding with further analysis, the reliability of this scale was checked. The Cronbach alpha value is .67, which is lower than the .7 recommended by DeVellis for this particular measure of internal consistency (2003). This does not mean that the scale is entirely unreliable since such a value is not unexpected for a scale with fewer than ten items (Pallant, 2020). The mean inter-item correlation was calculated next since it is a better indicator of scale reliability for a scale with fewer than ten items, and the ideal value is

between .2 and .4 (Briggs & Cheek, 1986). The mean inter-item correlation for the behaviour scale is .22, which falls within the desired range. This indicates that the behaviour scale is internally consistent.

One more check was done to ensure that two of the items on the scale, namely the facemask and face shield questions, were not redundant. An inter-item correlation matrix was generated to ensure that these two components were not too highly correlated. The table below shows that the correlation coefficient for these two items is .16, which is a sufficiently low correlation. The rest of the coefficients on the table below were all relatively low, meaning that there is no redundancy among the items in the scale.

Inter-Item Correlation Matrix

	Wash hands with soap more often than before	Avoid handshakes/ physical greetings	Avoid group meetings	Wear a facemask when outside	Wear gloves when outside	Keep a distance of at least 1-2 meters from other people	Wear a face shield/ protector when outside
Wash hands with soap more often than before	1.000	.206	.211	.241	.107	.269	.085
Avoid handshakes/ physical greetings	.206	1.000	.552	.157	.079	.256	.163
Avoid group meetings	.211	.552	1.000	.157	.133	.317	.210
Wear a facemask when outside	.241	.157	.157	1.000	.165	.378	.163
Wear gloves when outside	.107	.079	.133	.165	1.000	.221	.259
Keep a distance of at least 1-2 meters from other people	.269	.256	.317	.378	.221	1.000	.279
Wear a face shield/protector when outside	.085	.163	.210	.163	.259	.279	1.000

Table 2: Inter-Item Correlation Matrix for Items on the Behaviour Scale

The behaviour scale has been calculated for 1913 of the participants. The frequencies as shown in the table below indicate that the vast majority of participants (n=1386, 72.5%) who provided data on this measure fell within the middle of the scale with a value of 1. This value corresponds with the response "sometimes" on the questions that make up this scale, meaning that the participants tend to answer that they sometimes perform the relevant behaviours. Only 91 participants (4.8%) scored 0 on the scale, meaning that they never perform most of the behaviours. 436 participants (22.8%) indicated that they always perform most of the behaviours in the scale.

Preventative behaviour

		Frequency	Percent	Valid Percent
Valid	0	91	1.9	4.8
	1	1386	30.4	72.5
	2	436	9.6	22.8
	Total	1913	42	100.0
Missing		2646	58	
Total		4559	100.0	

Table 3: Frequencies table for preventive behaviour

Risk Beliefs

The beliefs variable is an ordinal scale based on a question asking the participants how at-risk they believe themselves to be in terms of contracting COVID-19. The four values on the scale are as follows: no risk, low risk, medium risk, and high risk. 1965 participants provided a valid answer to this question. Of those participants, 250 (12.7%) answered "no risk", 535 (27.2%) answered "low risk", 815 (41.5%) answered "medium risk", and 365 (18.6%) answered "high risk". One can see that the responses are clustered in the middle of the scale as opposed to the extremes. The table below displays these frequencies.

How much do you think you are at risk of catching COVID-19?

		Frequency	Percent	Valid Percent
Valid	No risk	1983	10.1	20.5
	Low risk	3138	16.0	32.4
	Medium risk	3433	17.5	35.4
	High risk	1140	5.8	11.8
	Total	9694	49.3	100.0
Missing	System	9971	50.7	
Total		19665	100.0	

Table 4: Frequencies table for the risk belief variable

Ordinal Logistic Regression

Assumptions

Before beginning the main analysis, the four necessary assumptions were tested. These are that 1) the dependent variable must be ordinal; 2) the independent variables must be continuous, categorical, or ordinal and treated as continuous; 3) there must be no collinearity between the independent variables; 4) there must be proportional odds, meaning that the independent variables have an identical effect at each cumulative split of the dependent variable.

The first two assumptions mentioned above are determined to be met without the need of any statistical tests. As mentioned in the descriptive statistics section above, the behaviour scale, which is the dependent variable in this analysis, is an ordinal scale. The scale components are distinct categories that are ordered in such a way that their meaning is tied to their order, which fits the definition of ordinal variables as presented by Field (2018). The main independent variables in this study, namely, socioeconomic status and beliefs, are continuous and ordinal, respectively. The IWI scale that measures socioeconomic status for this study fits the definition of a continuous variable because it is a scale of measurement rather than a set of distinct categories. The belief scale fits the definition of an ordinal scale mentioned above, and it is treated as a continuous variable by the main statistical test in this study. The additional independent (control) variables used in the final analysis (country,

cohort, perceived wealth, education, and employment) are all categorical except for perceived wealth, which is an ordinal scale.

Regarding the assumption that there is no multicollinearity between the independent variables, a correlation matrix is necessary. Multicollinearity refers to when two or more independent variables are highly correlated with one another, specifically when $r \geq .7$ (Pallant, 2020). The matrix in Appendix A shows the correlation between all of the variables. It is evident that the assumption of no multicollinearity has been met since all of the correlation coefficients are within the acceptable range.

The fourth and final assumption necessary for an ordinal logistic regression analysis is proportional odds, which is tested using the parallel lines test. The assumption is met when the test shows that $p > .05$. The tables below shows that $p = .13$ for the first model and $p = .09$ for the second, meaning that the assumption of proportional odds has been met.

Model 1 Test of Parallel Lines

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Null Hypothesis	752,676			
General	745,465	7,211	4	,125

The null hypothesis states that the location parameters (slope coefficients) are the same across response categories.

a. Link function: Logit.

Table 5: Test of parallel lines for Model 1

Model 2 Test of Parallel Lines

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Null Hypothesis	392,112			
General	363,549	28,564	20	,097

The null hypothesis states that the location parameters (slope coefficients) are the same across response categories.

a. Link function: Logit.

Table 6: Test of parallel lines for Model 2

Model 1 Ordinal Logistic Regression Analysis

The goal of the ordinal logistic regression analysis performed in this study is to evaluate the predictive ability of the socioeconomic status and belief variables upon the behaviour variable. For this analysis, data from 1355 participants was included. The Model Fitting Information table below shows that χ^2 (4, N= 1355) = 44.26, $p < .001$, meaning that the result of the overall analysis is statistically significant.

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	796,936			
Final	752,676	44,260	4	<,001

Link function: Logit.

Table 7: Model fitting information for the ordinal logistic regression analysis

The information in the goodness-of-fit table shows a comparison between expected and observed frequencies. Non-significant Pearson and Deviance χ^2 values are indicative of a well-fitting model (Tabachnick & Fidell, 2014). In the table below, the Pearson value is statistically significant with $p < .001$, and the Deviance value is not statistically significant with $p = .997$. This is a mixed result.

Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	924,549	678	<,001
Deviance	580,138	678	,997

Link function: Logit.

Table 8: Goodness-of-fit table for the ordinal logistic regression analysis

In the table below, the pseudo-R square value is shown, giving an indication of how well the model calculates the outcome. $R^2_N = .051$, meaning that the model explains 5.1% of the variance in scores on the behaviour scale.

Pseudo R-Square	
Cox and Snell	,032
Nagelkerke	,051
McFadden	,032

Link function: Logit.

Table 9: Pseudo R-Square table for the ordinal logistic regression analysis

The Parameter Estimates table below shows log odds coefficients under the "Estimate" column, which show the likelihood of certain values in the independent variables leading to changes in the dependent variable. None of the estimates for the items on the belief scale are statistically significant (p = .322; p = .633; p = .914), meaning that the effect they have on the behaviour scale is negligible. The only statistically significant effect within the model is that of the IWI scale on the behaviour variable, with a log-odds regression coefficient of .034 (p <.001) (odds ratio of 1.035). This means that for every one unit increase on the IWI scale, the odds of an increase in the behaviour score increase by a factor of 1.035.

Parameter Estimates

							95% Confidence Interval	
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[PBEHAVE2 = 0]	-1,499	,429	12,220	1	<,001	-2,340	-,659
	[PBEHAVE2 = 1]	4,325	,453	91,031	1	<,001	3,437	5,213
Location	iwi	,034	,005	41,217	1	<,001	,024	,045
	[Belief=,00]	-,272	,275	,979	1	,322	-,810	,267
	[Belief=1,00]	-,122	,255	,228	1	,633	-,623	,379
	[Belief=2,00]	-,027	,249	,012	1	,914	-,514	,460
	[Belief=3,00]	0[a]	.	.	0	.	.	.

Link function: Logit.

a. This parameter is set to zero because it is redundant.

Table 10: Parameter estimates table for the logistic regression analysis

From the model as a whole, it is evident that a person's scale on the IWI score has a small but statistically significant impact on where they fall on the behaviour scale. This means that wealth has a small effect on the preventative behaviours taken to reduce the spread of COVID-19. Interestingly enough, a person's belief in their risk of catching

COVID-19 does not appear to have a statistically significant effect on their behaviour in this study.

Model 2 Ordinal Regression Analysis

The goal of the ordinal logistic regression analysis performed in this study is to evaluate the predictive ability of the socioeconomic status and belief variables with the addition of variables covering country, cohort, perceived wealth, education, area of residence, and employment upon the behaviour variable. For this analysis, data from 602 participants was included. The Model Fitting Information table below shows that χ^2 (20, N= 602) = 235.51, $p < .001$, meaning that the result of the overall analysis is statistically significant.

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	627.62			
Final	392.112	235.507	20	<,001

Link function: Logit.

Table 11: Model fitting information for the ordinal logistic regression analysis

The information in the goodness-of-fit table shows a comparison between expected and observed frequencies. In the table below, the Pearson value is statistically significant with $p < .001$, and the Deviance value is not statistically significant with $p = 1.000$. This is a mixed result.

Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	2475.987	1006	<.001
Deviance	380.787	1006	1.000

Link function: Logit.

Table 12: Goodness-of-fit table for the ordinal logistic regression analysis (Model 2)

In the table below, the pseudo-R square value is shown, giving an indication of how well the model calculates the outcome. $R^2_N = .495$, meaning that the model explains 49.5%

of the variance in scores on the behaviour scale. Compared with Model 1 (R^2_N =.051), Model 2 explains significantly more variance in the behaviour scale scores.

Pseudo R-Square	
Cox and Snell	.324
Nagelkerke	.495
McFadden	.368

Link function: Logit.

Table 13: Pseudo R-Square table for the ordinal logistic regression analysis

The Parameter Estimates table below shows log odds coefficients under the "Estimate" column in addition to odds ratios. Not all of the estimates for the independent variables in this model were statistically significant (with $p \leq .05$). The odds ratio for the IWI variable (p= .006) indicates that an increase on the IWI scale increases the odds of an increase on the preventative behaviour scale. More specifically, for a one unit increase on the IWI scale, the odds of an increase on the preventative behaviour scale increase by a factor of 1.433. In comparison to the younger cohort, the older cohort is more likely to have a higher score on the preventative behaviour scale (OR = 1.866, p= .043). In comparison with the respondents from Ethiopia, respondents from India (OR = 114.319, p< .001) and Peru (OR = 33.649) have higher odds of having a higher score on the preventative behaviour scale. When comparing Vietnam to Ethiopia, however, the parameter estimate is not statistically significant (p= .405). None of the parameter estimates for the perceived wealth variable were statistically significant, meaning that there cannot be any meaningful conclusions drawn on the relationship between this variable and the preventative behaviour scale. The same was true for the education and belief variables. In comparison with the respondents living in urban areas, those in rural areas have decreased odds of having a higher score on the preventive behaviour scale (OR = .438, p= .001). Regarding employment, unemployed respondents have decreased odds of having a higher score on the preventive behaviour scale than those who are employed (OR = .439, p= .032).

Parameter Estimates

		Estimate	Odds Ratio	Std. Error	Wald	df	Sig.	95% Confidence Interval	
								Lower Bound	Upper Bound
Threshold	PBEHAVE2=0	-.382		8.490	.002	1	.964	-17.021	16.258
	PBEHAVE2=1	8.066		8.519	.896	1	.344	-8.631	24.763
Location	IWI	.360	1.433	.013	7.610	1	.006	.010	.062
	Older cohort	.624	1.866	.308	4.104	1	.043	.020	1.227
	Younger cohort	0[a]		.	.	0	.	.	.
	Vietnam	.604	1.829	.725	.694	1	.405	-.817	2.025
	India	4.739	114.320	.730	42.160	1	<.001	3.309	6.170
	Peru	3.516	33.650	.704	24.940	1	<.001	2.136	4.896
	Ethiopia	0[a]		.	.	0	.	.	.
	wealthP=6	1.255	3.508	6.104	.042	1	.837	-10.710	13.219
	wealthP=5	1.800	6.050	5.991	.090	1	.764	-9.943	13.543
	wealthP=4	1.103	3.013	5.997	.034	1	.854	-10.652	12.857
	wealthP=3	1.281	3.600	6.006	.046	1	.831	-10.491	13.053
	wealthP=2	0[a]		.	.	0	.	.	.
	No education	-1.989	.137	6.175	.104	1	.747	-14.092	10.115
	Primary	.155	1.168	6.009	.001	1	.979	-11.622	11.933
	Secondary	.266	1.305	6.011	.002	1	.965	-11.516	12.047
	Teaching cert.	.861	2.366	6.035	.020	1	.887	-10.968	12.689
	TVET	.796	2.217	6.195	.016	1	.898	-11.347	12.938
	Undergraduate	2.045	7.729	6.095	.113	1	.737	-9.900	13.991
	Postgraduate	0[a]		.	.	0	.	.	.
	Rural	-1.138	.320	.348	10.684	1	.001	-1.821	-.456
	Urban	0[a]		.	.	0	.	.	.
	Unemployed	-.824	.439	.384	4.613	1	.032	-1.576	-.072
	Employed	0[a]		.	.	0	.	.	.
	Belief=0	-.435	.647	.525	.686	1	.408	-1.464	.595
	Belief=1	.107	1.113	.488	.048	1	.827	-.850	1.063
	Belief=2	-.625	.535	.461	1.838	1	.175	-1.529	.279
	Belief=3	0[a]		.	.	0	.	.	.

a. This parameter is set to zero because it is redundant

Table 14: Parameter Estimates for Model 2

As mentioned previously, the second model explains more of the variance in the dependent variable than the first model. The IWI scale accounts for more slightly more variance in the second model than in the first, but it is not the most impactful variable (based on the odds ratios). The residence and country variables appear to have the greatest statistically significant effects on the behaviour scale among the independent variables.

Discussion

In this chapter, the aim is to interpret, contextualise, and expand upon the results obtained in the previous chapter. First, the results of each of the main independent variables upon the dependent variable will be explained and analysed. Then, the effect of adding control variables in the second model will be discussed. Possible explanations for why certain variables were or were not statistically significant in the analysis will occur. Finally, some limitations of this study will be presented.

Preventive Behaviour and Socioeconomic Status

As detailed in the regression analyses performed in the previous chapter, the IWI scale has a statistically significant effect upon the behaviour variable. In other words, socioeconomic status can be linked to the degree to which people in this study performed preventative behaviours. However, the IWI scale clearly does not work in isolation since its effect was stronger in the second model ($OR_{M1} = 1.035$; $OR_{M2} = 1.433$). More specifically, the IWI scale in the second model indicated higher odds of having an increased preventative behaviour score than in the first model. Even still, the effect was not very strong since the odds ratio was still quite close to 1.

Although limited, the literature points to wealth or socioeconomic status having a significant effect on preventive behaviour in the context of COVID-19 (Kollamparambil & Oyenubi, 2021; Papageorge et al., 2021; Dagba et al., 2021). The conclusion that can be drawn from the directly relevant literature detailed in the literature review is that being less wealthy makes it more difficult to be able to adopt preventive measures or behaviours, even if the respondents are knowledgeable of what actions are best. However, it is worth noting that these factors do not work in isolation. For example, Papageorge et al. (2021) included variables detailing work arrangements, pandemic-related income loss, and housing characteristics to their analysis on the effect of income on preventive behaviours; however, the researchers noted that in spite of the statistically significant relationship between income and preventive behaviour, the findings pointed to there being other unstudied variables having an effect.

From a theoretical perspective, adopting the Social Determinants of Health as a framework suggests that having a higher socioeconomic facilitates better health outcomes. This aligns with this study's outcome in that people with a higher socioeconomic status are more likely to adopt preventive behaviours, meaning that they are more likely to take action that protects their health in the context of COVID-19. However, it is worth noting that the aspects covered in this study are only a small part of what the Social Determinants of Health covers. The way in which the IWI variable measured socioeconomic status via material wealth meant that certain nuances were sacrificed in order to make the scale apply to all four studied countries. For example, having all of the material assets necessary to score high on the IWI scale does not directly indicate access to healthcare. Geographical and political aspects could be at play as well, such as if a person lives in a rural area with no nearby healthcare facilities, in spite of being relatively wealthy. Nevertheless, using a measure of socioeconomic status still gives a basic idea of health outcomes, even if there is a lack of nuance that could facilitate clearer answers.

Beliefs and Socioeconomic Status

In both of the models presented in the last chapter, the effect of the belief variable upon the socioeconomic status variable was not statistically significant, meaning that one cannot conclude that the former had an undeniable connection to the latter. This conclusion does not seem implausible given the literature. As mentioned above, the effects of poverty can trump a person's knowledge or belief that a certain type of preventive behaviour is effective against the spread of COVID-19. There are cases, however, where the spread of misinformation can affect a person's belief in their own risk of becoming sick. In addition to misinformation, there have been situations in which people aren't necessarily misinformed by rumours, but there is simply a lack of information altogether. As mentioned in the literature review, this was an issue in parts of Ethiopia. Regardless of which explanation best fits the scenario at hand, one can conclude that beliefs are less important to this study than other variables.

Further research, however, could render the idea of risk belief as a potentially useful tool of analysis. The key to making this work effectively may be to frame the research around the idea of building an explanation of why people hold certain beliefs regarding their risk of

being infected with COVID-19. The Social Determinants of Health could be useful in this context. For example, a person living in an impoverished, rural area may not have the same access to current health information as a person living in a city. In this case, the person in question may not understand their true level of risk in regards to a specific health concern.

Model 2 and the Addition of More Variables

Overall, the second model explains far more of the variance in behaviour scores than the first model. Adding more independent variables created a model that explains 49.5% of variance in behaviour scores as opposed to only 5.1% in the first model with only beliefs and the IWI scale as independent variables. Even though the second model provides increased insight, it still contains several components that do not bear a statistically significant effect, namely education, perceived wealth, and Vietnam (as compared to Ethiopia).

The educational attainment variable's lack of association with the behaviour scale could be attributed to the fact that some of the categories contained far fewer people than others. The vast majority of participants (81.8%) reported their highest achieved level of education as being Grade 12 or lower. The group who had completed more schooling than this was divided into five new categories due to the quantity of options given on the original survey. Four of those categories accounted for less than 1% of the participants who had answered that question. If the data had been different, the education variable may have had a statistical effect on the dependent variable since the literature tends to show a positive association between educational attainment and preventive behaviours (Papageorge et al., 2021; Kollamparambil & Oyenubi, 2021; Lüdecke & von dem Knesebeck, 2020). Also, the Social Determinants of Health point to education being a predictor of health outcomes due to how it is tied to income and job opportunities (McGill, 2016). Thus, this study's failure to link educational attainment with predictive behaviour does not indicate that further research is unnecessary.

The lack of effect of the perceived wealth variable could possibly stem from the fact that the scores do not reflect the same reality as the IWI scores. This could be something that comes down to cultural differences; one culture's perception of wealth and poverty may not be the same as the material asset-based measure of the IWI. The IWI scores for the respondents skewed strongly towards the high end of the scale. The perceived wealth scores did not skew towards the richer end of the scale, meaning that the way in which the

participants view their wealth differs from this study's main measure of that concept. One way of theorising this is by understanding that the IWI scale is a measure of absolute poverty (asking if someone has basic necessary items) while the perceived wealth variable measures relative poverty (asking if someone is less well off than others in their community) (Decerf, 2021).

Vietnam's lack of statistical significance does not make sense given the existing literature. Vietnam was the most successful of the four surveyed countries at keeping COVID-19 case numbers down in 2020 due to swift and strict measures taken. Given this information, it would make sense for Vietnamese respondents to be much more likely than those from Ethiopia (the comparison group) to have higher behaviour scores. One possible reason for this result could be the relatively small size of the group of Vietnamese respondents (*n*=332; 7.3%).

The fact that Peruvian and Indian respondents were more likely to have a higher behaviour score compared to the Ethiopian respondents is not surprising given the literature. Although all three countries struggled with the pandemic in 2020, and the literature relevant to Ethiopia emphasised the lack of awareness regarding recommended preventative behaviours. What is surprising is the strength of the odds ratios for these two countries (OR_P = 33.65; OR_I = 114.31). These two odds ratios are the strongest in the entire study.

Another strong odds ratio is the inverse relationship between residents of rural areas (OR = 0.32) and increased behaviour scores. Given the literature, this relationship is logical. Several studies referenced in the literature review explicitly state that rural residents are less likely to engage in preventive behaviours (Papageorge et al., 2021; Kollamparambil & Oyenubi, 2021; Callaghan et al., 2021; Nguyen et al., 2020). The literature detailing the country-specific contexts indicates the same for the most part. India may be an exception since its densely-packed cities made social distancing impossible in many cases.

The last variable with statistically significant effect on the dependent variable is the cohort variable. The older cohort was more likely to have a higher preventative behaviour score than the younger one. This could be the case for several reasons. First, it is likely that the participants in the older cohort are, on average, more well-off than their younger counterparts since they have been in the workforce longer. Another possible explanation is that younger people in many places tended to be the most likely to adopt fewer preventative behaviours and skirt around the rules, which could be for social reasons.

Limitations

Some of the main limitations for this study stem from the fact that it comes from a secondary data source. The survey questions were not formulated and asked with the purpose of answering the questions addressed in this study. As such, this study is missing information that could lead to better answers. For example, gender was not recorded in the source survey. Based on the literature, this appears to be a key measure of how likely an individual is to engage in preventive, risk-avoidant behaviours (Yıldırım et al., 2020; Sun et al., 2020; Rodrigues-Besteiro et al., 2021). Also, it would have been useful to have more information on risk tolerance and resistance to misinformation in order to add nuance and clarity to the risk belief variable.

One issue that affected the statistical outcomes of this study was the missing or insufficient data that led to a small sample sizes for some groups within the study. In the Young Lives questionnaires, there were possible responses to specify whether the participants did not know the answer to the question or if they did not want to give an answer. These were recoded as missing responses for the purpose of this study, and the resulting discrepancy in sample sizes indicates that many participants did not answer all of the questions. This effect was compounded by the fact that the IWI and behaviour variables held a missing value for participants who did not answer at least one of their component questions. Generally, larger sample sizes yield studies that are more statistically accurate and more generalisable (Punch, 2014), meaning that the small sample sizes weakened the statistical ability of this study to give an accurate answer to the research questions.

Another key limitation is the way in which the modified IWI variable was assembled and calculated for the sake of this study. The original scale loses a small amount of statistical power when two or three elements are missing, but this study omitted three elements and completely changed another. Sufficiently re-assessing the quality of the modified scale is beyond the scope of this study, which is why it was not done.

Conclusion

The goal of this study was to assess the effects of COVID-19-related risk beliefs and socioeconomic status upon preventive behaviour in young people living in Peru, Ethiopia, India, and Vietnam. The study used secondary data originating from a phone survey done in 2020 by the Young Lives project, a longitudinal study on young people and poverty. When only the main three variables were analysed, socioeconomic status had a small but statistically significant effect on the prevalence of preventive behaviour. The belief variable had no statistically significant effect. In the second analysis, where control variables were added, socioeconomic status had a slightly stronger effect, and the model as a whole had a larger effect on preventive behaviour than the first model. Once again, belief had no statistically significant effect.

The association between higher socioeconomic status and increased prevalence of preventive behaviours falls in line with the theoretical framework provided by the Social Determinants of Health. The environments in which people live influence their health, and having less material wealth tends to reduce an individual's likelihood of remaining healthy. In the context of this study, the Social Determinants of Health imply that wealthy people are more likely to act in ways that protect their health because they are able to do so. Although future, more thorough research could potentially prove otherwise, whether or not people believe they are at risk of becoming infected with COVID-19 does not relate to how much preventive behaviour they practice because other circumstances matter more.

As discussed previously, more research on several topics covered in this study is needed; however, there is still value found in the conclusions drawn here in terms of health promotion and policymaking. Increasing the development community's understanding of why people act the way they do in relation to their health is essential because it provides insight into how to better assist people in making choices in favour of their health. This is especially crucial in developing countries where healthcare systems may be overburdened or underfunded. Tackling health issues at their underlying causes as opposed to merely treating symptoms is arguably the most sustainable approach to health promotion.

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Appendix

Appendix A: Correlation Matrix between All Variables

Correlations

			How much do you think you are at risk for catching covid?	International Wealth Index	Are you employed?	COUNTRY	Case source is DataSet2	What is the (highest) education level that you completed?	How would you describe the household you were living in? Currently	Area of residence (urban/rural) in call 2
Spearman's rho	How much do you think you are at risk for catching covid?	Correlation Coefficient	1,000	-,084**	,011	,345**	-,048**	-,040**	,065**	,073**
		Sig. (2-tailed)	.	<,001	,376	<,001	<,001	,003	<,001	<,001
		N	9694	9638	6910	9694	9694	5438	9693	9650
	International Wealth Index	Correlation Coefficient	-,084**	1,000	-,101**	-,455**	-,021*	,298**	-,314**	,222**
		Sig. (2-tailed)	<,001	.	<,001	,000	,037	<,001	<,001	<,001
		N	9638	9712	6924	9712	9712	5428	9698	9670
	Are you employed?	Correlation Coefficient	,011	-,101**	1,000	,012	-,095**	-,009	,002	-,086**
		Sig. (2-tailed)	,376	<,001	.	,306	<,001	,530	,840	<,001
		N	6910	6924	6960	6960	6960	4465	6958	6921
	COUNTRY	Correlation Coefficient	,345**	-,455**	,012	1,000	-,011	-,376**	,275**	-,159**
		Sig. (2-tailed)	<,001	,000	,306	.	,123	<,001	<,001	<,001
		N	9694	9712	6960	19665	19665	5464	9754	9739
	Case source is DataSet2	Correlation Coefficient	-,048**	-,021*	-,095**	-,011	1,000	,042**	-,017	,025*
		Sig. (2-tailed)	<,001	,037	<,001	,123	.	,002	,089	,012
		N	9694	9712	6960	19665	19665	5464	9754	9739
	What is the (highest) education level that you completed?	Correlation Coefficient	-,040**	,298**	-,009	-,376**	,042**	1,000	-,247**	,341**
		Sig. (2-tailed)	,003	<,001	,530	<,001	,002	.	<,001	<,001
		N	5438	5428	4465	5464	5464	5464	5455	5431
	How would you describe the household you were living in? Currently	Correlation Coefficient	,065**	-,314**	,002	,275**	-,017	-,247**	1,000	-,040**
		Sig. (2-tailed)	<,001	<,001	,840	<,001	,089	<,001	.	<,001
		N	9693	9698	6958	9754	9754	5455	9754	9710
	Area of residence (urban/rural) in call 2	Correlation Coefficient	,073**	,222**	-,086**	-,159**	,025*	,341**	-,040**	1,000
		Sig. (2-tailed)	<,001	<,001	<,001	<,001	,012	<,001	<,001	.
		N	9650	9670	6921	9739	9739	5431	9710	9739

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

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