

The *Covid19Impact* Survey: Assessing the Pulse of the COVID-19 Pandemic in Spain via 24 questions

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Abstract

In this paper, we describe the results of analyzing a large-scale survey, called the *Covid19Impact* survey, to assess citizens' feedback on four areas related to the COVID-19 pandemic in Spain: social contact behavior, financial impact, working situation and health status. A total of 24 questions cover the areas of demographics, their home situation, social contact behavior, personal economic impact, their workplace situation and their health. The survey was responded to by 146,728 participants over a period of 44 hours. Such a large response enables us to gain new insights, as well as an unprecedented glimpse at respondents' personal experiences and concerns during the current COVID-19 pandemic. From the analysis, we draw 11 implications for the design of public policies related to the management of the COVID-19 pandemic.

Keywords: COVID-19, citizen's science, user studies

1. Introduction

The first confirmed case of COVID-19 in Spain was reported on January 31st, 2020 when a German tourist tested positive in the Spanish Canary Islands. However, this was an isolated, imported case. It was not until February 24th when Spain confirmed several new COVID-19 cases related to a recent COVID-19 outbreak in the North of Italy. Since that date, the number of COVID-19 cases has been growing exponentially in Spain, such that by March 30th, 2020 there were over 85,199 confirmed cases, 16,780 recoveries and the staggering figure of 7,424 deaths, according to the official figures. On March 25th, 2020, the death toll attributed to COVID-19 in Spain surpassed that of mainland China and it is only surpassed by the death toll in Italy. The economic and social impact of the COVID-19 pandemic in Spain is without precedent.

To combat the pandemic, the Spanish Government implemented a series of social distancing and mobility restriction measures. First, all classes at all educational levels were cancelled in the main hotspots of the disease: on March 10th, in the Basque Country, and on March 11st in the Madrid and La Rioja regions. All direct flights from Italy to Spain were cancelled on March 10th. On March 12th, the Catalan Government quarantined four municipalities that were particularly affected by the virus. On March 13th, the Government of Spain declared a state of emergency for two weeks across the entire country, which was later extended until April 11th. Unfortunately, different regions implemented containment measures at different times while still allowing travel to other regions, which might have enabled infected individuals to spread the virus. Since the state of emergency was established, all schools and university classes were cancelled; large-scale events and non-essential travel were forbidden, and workers were encouraged to tele-work. Despite these measures, the

daily growth rate in the number of confirmed COVID-19 cases continued to grow. Thus, on March 30th new mobility restriction and social distancing measures were implemented: all non-essential labor activity was to be interrupted for a 2-week period.

These measures have put a halt to the daily lives of most of the people in Spain. However, the number of confirmed cases, intensive care patients and deaths continues to grow exponentially. It is unclear how effective these measures will eventually be, as well as their impact on people's economic, physical and mental well-being. To shed light on these important, yet unknown questions, we designed a 24-question survey, called the *Covid19Impact* survey, to be deployed to the Spanish population. The survey was extremely well-received in Spain, becoming viral in the 12 hours after its publication and yielding to 146,728 answers. It is one of the largest surveys in the world carried out in the context of the COVID-19 pandemic.

In this paper, we first describe the *Covid19Impact* survey and the methodology that we followed to gather a representative sample via a citizen's science approach. Next, we present our preliminary results of the analysis of the answers and the main insights derived from them. Finally, we describe our conclusions and lines of future work.

2. Methodology

2.1. The *Covid19Impact* Survey

Despite the availability of data regarding the number of confirmed COVID-19 cases, hospitalized and intensive care patients and deaths, there is a scarcity of high-quality data about important questions related to the population's experience of the COVID-19 pandemic.

First, there is the issue of the under-reporting of confirmed cases and COVID-19 related deaths. Recent work by the Imperial College COVID-19 Response Team (Flaxman, 2020), estimates that 15% of the Spanish population could be infected by COVID-19. Assessing the percentage of infected individuals is of utmost importance to build accurate epidemiological models and to assist policymakers in their decisions.

Second, there are unknowns regarding the sources of infection. Are people being infected by friends, family members, relatives and co-workers? Or are they being

infected because of serendipitous interactions in supermarkets or at the bakery? The effectiveness of different government interventions will depend on the answers to these questions.

Third, the economic impact that the COVID-19 crisis will have on people's lives is yet to be quantified. According to the latest figures from the Spanish Industry, Commerce and Tourism Ministry¹, only 0,2% of Spanish companies have 250 or more employees; 45% of companies are micro (1-9 employees) or small (10-49 employees) and 54% of companies consist of the self-employed. Small businesses are generally unprepared to confront such a crisis. Moreover, tourism represents 14.6% of Spanish GDP and 2.8 million of jobs and these are threatened by the COVID-19 pandemic. Measuring the impact that COVID-19 is having on people's finances is of great value to policymakers.

Finally, there is the personal experience related to having to be confined in the home for weeks. How much longer are citizens able to sustain this situation?

To answer these questions, we designed a 24-question survey that we refer to as the *Covid19Impact* survey, shown in Appendix 1. The survey is divided in 6 sections that address different dimensions related to the citizens' experience of the COVID-19 crisis. All questions are anonymized to preserve privacy and no personal information is collected. In addition, our snowball methodology ensures anonymity and the absence of constraining or biasing factors as everyone contributed in a voluntary, and in many cases very committed, way. The survey can be found at covid19impactsurvey.org.

First, the survey obtains explicit consent from the users. Only when consent is granted and respondents confirm they are adults, respondents can respond to the rest of the questions.

The first section (Q1-Q4) gathers basic *demographics*: age range, gender, country and postal code. Next, there are 3 questions (Q4-Q7) related to the *home situation*: type of home, number of people in the home and their ages. The following 7 questions (Q8-Q14) address the *social contact behavior* of the respondents during the last two weeks. This is an important section of the survey as we aim to understand the level of social interaction that people have despite the social distancing measures. The questions ask about having had contact with

¹ <http://www.ipyme.org/es-ES/ApWeb/EstadisticasPYME/Documents/CifrasPYME-enero2019.pdf>

infected individuals, whether children are taken care of outside the home, if they have an external person coming to their house (e.g. house cleaner), for what types of activities have they left their home and what transportation means have they used. The last two questions intend to capture people's perceptions of the confinement measures: if they think they are enough to contain the pandemic and for how long they would be able to tolerate the containment situation.

Personal economic impact is assessed with questions Q15 and Q16, followed by three questions (Q17-Q19) related to their *workplace* situation.

Finally, the last 5 questions (Q20-Q24) address their *health* state to assess how many people might be infected by the virus.

None of the questions except for the consent question are compulsory and all the health-related questions include "I prefer not to answer" as a choice.

2.2. Deployment of the Survey

The goal was to collect as representative of a sample as possible in a short amount of time, as the COVID-19 situation is rapidly evolving and new government measures might be implemented. The objective is to gather a snapshot of people's experiences regarding the 6 sections described above.

Anticipating the start of new mobility restriction and social distancing measures on Monday, March 30th, we deployed the survey on Saturday, March 28th at 8 PM. We used social media (Twitter and WhatsApp) to distribute it to a wide set of highly connected users who, in turn, distributed it to their contacts. The survey was also distributed by professional organizations, townhalls, civil groups and associations. It inspired tens of thousands of citizens to not only contribute with their own answers, but to share it with their friends, relatives, colleagues and followers. In the 12 hours that followed, the survey went viral in Spain; by the afternoon of Monday, March 30th, we had collected 146,728 answers. Figure 1 illustrates the growth in the number of answers over time. As shown in Figure 1, the peak was reached in the time frame between 4 PM – 5 PM on Saturday, March 29th, with around 15,000 answers per hour.

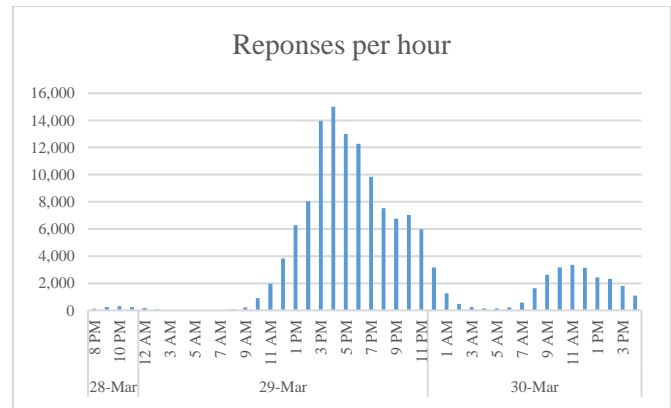


Figure 1. Evolution of the number of answers collected by the Covid19survey over time, reported in 1-hour intervals.

The initial deployment was carried out via an online survey platform in a completely anonymous way. Given the high volume of answers, on March 30th, 2020, we moved the survey to Survey123² for future editions of the data collection.

The results that we report in this paper correspond to the analysis of the 146,728 answers collected between the evening of March 29th and 4 PM on March 30th.

3. Results

3.1. Data Cleansing

We eliminated all answers with blank (10,787) and invalid (8,161) postal codes, yielding 127,780 answers. Thus, we report the results of analyzing these 127,780 answers.

3.2. Demographics and Home Situation (Questions Q1-Q7)

Figure 2 displays the demographic information of the respondents: **59.4%** (N=75,712) were female. In terms of age, we received between 1,272 (age<20) and 34,918 (age between 41-50) answers for each age group.

² <https://survey123.arcgis.com/>

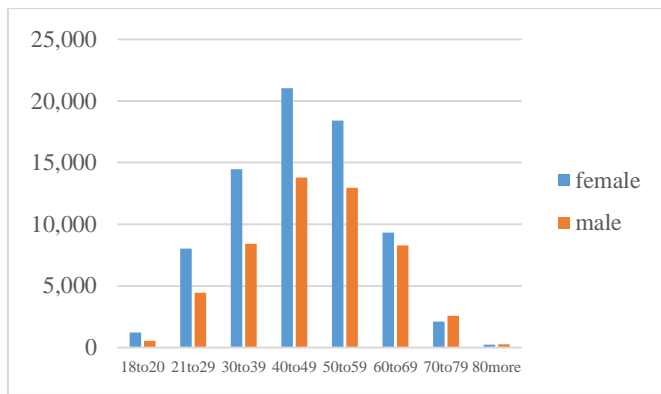


Figure 2. Demographic (age and gender) distribution of the participants

Geographically, most respondents were from the Valencian region (76.2%, N=92,230). However, there were also many answers from other regions of Spain (N=34,144), as shown in Figure 3.

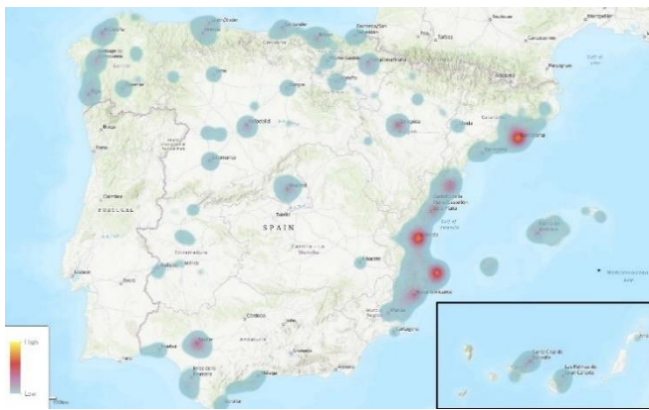


Figure 3. Heatmap of survey answer location (generated via ArcGIS)

Almost all respondents (98.6%, N=123,831) lived in a single-family home (N=41,563) or an apartment (N=82,268). Most of the participants lived in a home with 2 (29.9%, N=38,035), 3 (25.9%, N=32,947) or 4 (27.1%, N=34,503) people, which is consistent with Spain's demography. Regarding the age composition of the homes, 11.7% (N=13,793) of respondents lived with older adult (age>60) and 15% (N=17,707) of respondents lived in homes inhabited only by the elderly.

3.3. Social Contact Behavior (Questions Q8-Q14)

With respect to social contact behavior with confirmed COVID-19 patients (Q8), 18.2% (N=18,423) of respondents reported having had close contact with a person who was infected with coronavirus. The most common social context was a co-worker (5.4%, N=6,850), a home member (4.7%, N=3,573) or a relative (2.4%, N=3,084). Interestingly, a gender-centric

analysis of the answers to this question revealed a significant ($p<0.001$) difference between male / female respondents that had been in close contact with a patient (and thus were healthcare workers, N=2,431): 70% of the respondents were female vs 30% male.

When asked if an outside person regularly visited the home (Q10), we identified a significant difference ($p<0.001$) between older adults (age>70) and younger respondents: 22% of older respondents (N=5,061) regularly had a person coming to their home vs only 13.6% in the case of younger adults (N=119,963). This is an important finding as special measures might need to be taken to protect the 22% of older adults who regularly receive external people in their homes.

Respondents left their homes during the social distancing period for a variety of purposes (Q11) as shown in Figure 4: covering basic needs (supermarkets and pharmacy) was the most common reason, reported by 47.9% of respondents, followed by going to work (31.9% of respondents, N=126,915). We identified statistically significant differences ($p<0.001$) regarding age and gender. Older respondents (age>60, N=22,844) were more likely to stay entirely at home (13.9% older vs 7.7% for younger), but leave their home to go to the pharmacy (48.4% vs 39.3%) and newspaper stand (9.4% vs 4%).

Younger respondents (age<60, N=104,875) left the home to help others (12.2% vs 6.6%) and were also more likely to leave for work (36.0% vs 14.5%) than older respondents (age>60). Interestingly, the youngest respondents (18-29 years, N=15,560) were also much more likely to stay entirely at home vs respondents over 30 (15.1% vs 8.0% N=112,159).

Regarding gender, among all female respondents (N=75,373), 12% reported not leaving the home vs 6.3% among male respondents (N=51,542). This difference was statistically significant ($p<0.001$). The opposite pattern is found with respect to leaving the home to go to work, where 28.1% of all female participants vs 37.4% of all male respondents selected this option.

The main means of transportation (Q12) used by respondents was individual, 86.3% (by foot, individual car, motorcycle, scooter) vs shared, 5% (public transport, shared car, taxi) for N=126,659. In this question, we observe the same gender patterns as in Q11: among female respondents (N=75,118), 11% reported not leaving the home vs 6% among male respondents

(N=51,541). Moreover, shared transportation means were more likely among female respondents (5.1%) vs their male counterparts (4%). These differences are statistically significant ($p < 0.001$).

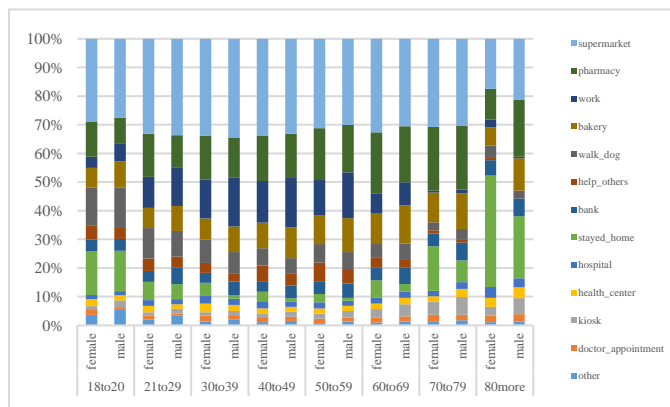


Figure 4. Reasons for leaving the home by gender and age

The last two questions in this section (Q13 and Q14) concern the personal experience of respondents regarding the containment measures. Most respondents believe that the government should implement more measures to contain the pandemic (46.4%, N=127,077) and only 1.7% think that the measures are too severe. There was a significant difference in the support of the measures by age group. Despite being at a lower risk of death, 52.7% of younger people (age < 60 N=97,906) believed measures should be stronger, vs 35.6% older people (age > 60 N=21,168).

Again, there was a significant gender difference in the opinions of respondents. Among female respondents (N=75,447), 48.6% believe that the government should do more vs 43% among male respondents (N=51,630). Regarding whether the measures were too much, the pattern is reversed: among female respondents, 1.2% thought that this was the case, vs 2.4% among male respondents. All differences were statistically significant ($p < 0.001$).

Question Q14 was meant to explore how sustainable citizens consider the social distancing measures to be. Most respondents (44.4%) answered that they could continue in this confined state for 1 additional month, yet a non-negligible 29.4% reported being able to continue for 2 to 6 months (N=124,077). An interesting gender difference is found for those who responded that they could stay in confinement for 6 months: among female participants, 7.9% reported this to be the case vs 13.7% among male participants ($p < 0.001$). This might be due to the fact that women see their workload increased

during the weeks of social distancing and mobility restriction.

3.4. Personal Economic Impact and Workplace Situation (Questions Q15- Q19)

An inevitable consequence of the COVID-19 pandemic is its economic and labor impact. Spain is a country with mostly small businesses, many of which are family owned. Questions Q15 through Q19 aim to shed light on the individual experiences and fears of people regarding their financial and employment situation.

When asked about the economic impact that the COVID-19 crisis is having on respondents' lives (Q15), 66.1% (N=125,758) felt that the crisis had not yet significantly affected them economically. Note that a large percentage of our respondents (41%) worked in public sectors (education, public administration, essential services and health). Yet, 19.8% had lost a significant part of their savings, and 6.5% had lost their job. Among the respondents who had worked in the last month, there were significant differences in the distribution of work activities, as show in Table 1. Most affected professions include retail, hospitality, manufacturing and other. Least affected are education and public administration.

	Lost job or business (N = 14,471)	Not lost job or business (N = 78,600)
Administrative services	6.1%	5.2%
Retail	12.6%	6.6%
Communications	3.6%	3.6%
Construction	6.2%	2.4%
Domestic service	1.2%	0.8%
Education	7.6%	18.3%
Entertainment/Arts	4.5%	1.8%
Essential services	1.8%	8.4%
Finance	1.2%	3.4%
Food production	1.5%	1.7%
Health and social services	5.7%	7.6%
Hospitality	10.7%	2.9%
Manufacturing	7.0%	4.2%
Other	18.7%	11.7%
Professional/technical/science	6.9%	8.7%
Public administration	0.9%	9.7%
Sanitation	0.4%	0.7%
Transport	3.2%	2.2%

Table 1. Distribution of jobs between respondents who had or were in danger of losing their job/business vs those who were not

Small businesses have so far borne the brunt of the economic impact. For respondents working in larger companies (100+ employees), 82.3% (N=21,894) reported that they had not yet been significantly affected, vs only 50% (N=35,262) of workers at the smallest

companies (1-9 workers) being unaffected. Among those working in small companies, **15.1%** reported their companies were facing bankruptcy.

Again, there is a gender-based statistically significant difference ($p < 0.001$): among female respondents ($N = 74,318$), **3.6%** reported not being able pay their mortgage and/or pay for food vs 3% among male respondents. In terms of having lost their jobs and/or savings, this option was selected by **19.4%** among female participants vs 17.3% among male respondents.

These figures paint a worrisome picture of the economic impact of the pandemic.

With respect to the labor situation of our respondents (Q16), the majority (**69.7%**, $N = 126,582$) reported working in the last month. A small fraction, **4.7%** of respondents were students.

Question Q17 focused on whether respondents had gone to work in the last week. The answers are almost evenly split between the three available options: 32.2% did not go to work, 33.2% tele-worked and 34.6% went to work ($N = 88,610$).

Statistically significant gender differences ($p < 0.001$) are observed regarding working participants who: (1) did not go to work (**35.4%** among female participants, $N = 51,420$ vs 27.6% among male participants, $N = 37,190$) and those who (2) did go to work (31% among female participants vs **39.6%** among male participants). A small gender difference was found for those who tele-worked (33.5% among female participants vs 32.8% among male participants). In sum, female workers were significantly more likely to stay home than male workers.

3.5. Health (Questions Q20-24)

Finally, questions Q20-Q24 asked respondents about their health.

Regarding risk factors, we obtained an even split between those who belonged to one of the risk groups (47.3%) vs not (47.8%), $N = 124,862$.

Question Q21 aimed to evaluate the ability of respondents to isolate themselves from family members were they to be diagnosed with coronavirus. This is an important question given the relevance of implementing effective quarantine measures during the control phase of the pandemic (after the peak of infections is reached). Whereas **71.8%** of respondents reported having the

ability to properly isolate themselves, a non-negligible 28.2% of respondents acknowledged not having the necessary resources to implement a proper quarantine in place ($N = 126,885$).

A gender-based analysis reveals statistically significant ($p < 0.001$) differences between genders: among female participants ($N = 75,344$), **29.6%** reported not having the appropriate infrastructure to isolate themselves when compared to 26.1% among male participants ($N = 51,541$).

In terms of age, **26.3%** of respondents aged 80 and older ($N = 502$) reported not being able to properly isolate themselves in the case that a quarantine was needed, probably because they need assistance in their activities of daily living. It is also notable that all respondents in age groups below 60 years old report not having the appropriate quarantine resources in over 30% of cases. This might be due to the presence of children in the home. Indeed, **42.2%** of adults with children ($N = 25,139$) vs 26.4% of adults without children ($N = 61,266$) report not being able to properly isolate themselves. Interestingly, among those living with the elderly ($N = 13,773$), **25%** reported not having appropriate quarantine infrastructure at home.

To shed light on the percentage of the population that might be infected with coronavirus, Q22 asked respondents if they currently had any of the COVID-19 related symptoms that were unusual for them: **17%** of respondents reported having at least one of the relevant COVID-19 symptoms ($N = 123,219$), and **6.5%** reported having at least one of the more severe symptoms (fever, cough, and difficulty breathing). Interestingly, these percentages are at par with the estimated 15% of infected people in Spain according to (Flaxman, 2020). Gender-wise, a larger percentage of women (**18%**, $N = 73,554$) vs men (13.4%, $N = 50,039$) reported having symptoms. The age group who most reported having symptoms was the 41-50 years group (30.3%, $N = 20,041$).

Finally, when asked for whether respondents had been tested for COVID-19, **92.4%** ($N = 119,356$) felt they didn't need to be tested; **6.4%** were told by their doctor they should be tested, but were told no tests were available; 0.7% had tested negative; 0.3% had tested positive, and 0.2% were waiting for their results, resulting in an overall test rate of 1.2%, as shown in Table 2. We found statistically significant ($p < 0.001$) differences between those who exhibited COVID-19 symptoms (difficulty breathing, dry cough and fever) and those who didn't and their answers regarding

testing: **92.9%** (N=115,668) of those who didn't have symptoms considered testing not necessary, vs only 62.5% (N=7,366) for those who had symptoms.

When looking at Q8 (whether they had close contact with an infected individual) together with Q23 (whether they had been tested for COVID-19 and the results), we observe some interesting patterns. Among those who had tested positive (N=435), **75,8%** had had close contact with a known infected individual: for **31,8%** had been through a friend or relative; **18%** through a client; **24,6%** through a patient (they were healthcare workers) and only **0,7%** at work. This means that in a very high percentage of cases, respondents with COVID-19 knew who might have infected them.

	Severe symptoms	Non-severe/no symptoms
Negative	2.4%	0.6%
No need	62.5%	92.9%
No test available	31.1%	6.0%
Positive	2.7%	0.3%
Waiting for results	1.4%	0.2%

Table 2. Testing needs, depending on presence of symptoms (all differences between the symptoms/no symptoms groups are statistically significant, $p < 0.001$)

Discussion

Through the survey answers we identify several patterns and implications for the design of public policies in the context of the COVID-19 pandemic.

1. *The value of involving citizens.* We were overwhelmed by the extremely positive response of citizens to the survey. Mayors in large and small towns got involved and shared it with their employees and citizens; professional and civic associations disseminated it among their members; individuals advertised it among their contacts, and a few media organizations gave it visibility via articles and posts. The vast majority of respondents were enthusiastic and supportive of the initiative, yet also asked for the results to be shared as soon as possible. This outstanding response by people might reflect a societal need to have more information about the impact of COVID-19 in our lives, but is also a wonderful example of citizen's science and people's willingness to help by contributing with their answers to achieve a more data-driven decision-making processes.
2. *The impact of close contacts.* Over 18% of respondents reported having had close contact with someone who was infected by the coronavirus. This percentage was much higher (75,1%) among those who had tested positive for COVID-19. This increases the likelihood that those testing positive were infected by someone they knew and had close contact with, rather than, for example, a random infected stranger in a supermarket. This could have implications for containment strategies.
3. *Gender matters.* Numerous statistically significant differences were found between male and female respondents, with a clear pattern of placing women in situations of higher vulnerability or exposure when compared to men. As in other aspects of society, gender-based differences exist in the context of a pandemic. It is a socially important factor that needs to be considered.
4. *Age also matters.* We identified statistically significant differences in the social contact behavior questions between older participants (aged 70 and older) and younger participants (aged 60 and younger). Older respondents were more likely to stay home, and to leave their house to go to the pharmacy and newspaper stand. There were also different aged-based attitudes towards the containment measures: younger participants were significantly more supportive of stronger measures than older participants.
5. *Citizens demand more measures,* as over 46% of respondents were supportive of implementing additional social distancing measures. This result might reflect the worry in people's minds regarding the exponential progression of the pandemic and the lack of clear signs of flattening the curve at the time of answering the survey.
6. *And are willing to sustain social distancing for a month or more.* Most respondents stated being able to sustain the social distancing measures for one additional month or more. Citizen's solidarity with the measures is reflected by the fact that over 29% of respondents reported being able to stay at home for two to six additional months.
7. *The economic impact of the pandemic is evident,* particularly for those working in small companies, 15% of which were reported to be facing bankruptcy. Moreover, over 19% of participants responded that they had lost a significant portion of their savings, some to the point of not being able to pay their mortgage or buy food.

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8. *The role of tele-work and labor mobility.* Among those who were working, roughly one third of respondents reported tele-working and one third leaving the home to go to work. The tele-work figure is lower than in other countries. For example, in the US, it is estimated that 56-62% of the workforce could work remotely³. Moreover, on March 31st, the Government established labor mobility restrictions for all non-essential professions. Given that 69,7% of respondents (N=88,437) reported having worked in the last month, our expectation is that this ~23% of the population will be impacted by such measures. Regarding workplace infections, we found that 18,8% of those who tested positive (and didn't work in the healthcare sector) had had close contact with a client who had coronavirus and only 0,7% of respondents had had such a contact with a colleague.
 9. *Quarantine infrastructure might be needed,* as over 28% of respondents reported not having the appropriate infrastructure to isolate themselves at home. Effective quarantine measures for asymptomatic or lightly symptomatic patients are key to control the spread of the pandemic. Thus, developing the needed infrastructure before reaching the peak of the infection might be key.
 10. *The number COVID-19 infected individuals is certainly higher than officially reported.* In our survey, over 17% of respondents reported having at least one of the COVID-19 related symptoms and over 6.5% reported having at least one of more severe symptoms (fever, cough and/or difficulty breathing). These figures are consistent with recently published research. However, they are a rough estimation based on self-reported symptoms and not on a medical diagnosis.
 11. *More tests are needed. In terms of testing capabilities,* over 6% of respondents reported not having been able to do the test due despite their doctor's recommendation. Moreover, a significant difference was found between those who had the more severe COVID-19 symptoms (6.5%, N=123,219) and those who didn't regarding their attitudes towards testing. Given these large percentages of population with symptoms, it is evident that there is a need for many more tests.

Conclusions and Future Work

The COVID-19 pandemic is undoubtedly impacting the lives of citizens. While there is abundant data regarding the number of reported cases, hospitalizations and intensive care patients and deaths, there is a scarcity of data about the individual experiences of people, their personal, financial and labor situations, their health state and their fears. This paper reports the first results of analyzing a large-scale, rich dataset of self-reported information regarding the social contact, economic impact, working situation and health status of over 140,000 individuals in Spain. It is probably one of the largest population surveys in a single country carried out in the context of an infectious disease pandemic.

The data is extremely rich and multi-faceted. Thus, it offers numerous avenues of future work and deeper analysis according to different dimensions, including location (at a zip code level) which we have not covered in this paper.

We plan to launch successive versions of the *Covid19Impact* survey on covid19impactsurvey.org in consecutive weeks throughout the COVID-19 pandemic, to assess the pulse of the virus from the perspective of citizens over time and assess changes in people's situations and perceptions regarding the virus.

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References

- Flaxman, S. e. (2020). *Estimating the number of infections and the impact of non-pharmaceutical interventions on Covid-19 in 11 European countries*. London, UK : Imperial College.

³ <https://globalworkplaceanalytics.com/telecommuting-statistics>

Appendix 1. Survey Questions

(Translated from Spanish) <http://covid19impactsurvey.org>

Start	Consent	I am an adult and I consent to taking this survey I am not an adult, or I do not consent taking this survey (<i>skip to end</i>)	Q13 Do you believe that the measures the government have taken are enough to contain the spread of coronavirus? No, should be stricter Yes, are about right Yes, but are too strict Prefer not to respond Don't know
	Q1 In which country are you presently in?	Spain and other Latin American countries	Q14 If you are current confined to not leaving your home, how much longer can you stand it? 0 days, I can't stand it anymore 1 week 2 weeks 1 month 2 months 6 months
Basic data	Q2 What is your age range?	18-20 21-29 30-39 40-49 50-59 60-69 70-79 80 or more	Economic impact
	Q3 What is your gender?	Male Female	Q15 What kind of economic impact has the coronavirus had on you? (check all that apply) No or little impact I lost my job I lost my savings I can't pay my mortgage anymore I can't afford to buy food My business is in danger of bankruptcy
	Q4 Postal code	Entered as text	Q16 Have you gone to work in the last month? Yes No No, I'm a student
Home situation	Q5 Type of home	Single Family Apartment Old age home Home for disabled people Prison/Jail Hotel Other shared accommodation (monastery, etc.) Camping Homeless Other	Workplace (skip unless the previous answer was yes)
	Q6 Number of people in home (including you)	1 2 3 4 5 or more	Q17 Have you gone to work in the last week? Yes No No, but I'm teleworking
	Q7 Age(s) of people in your home (check all that apply)	10 or less 11-20 21-29 30-39 40-49 50-59 60-69 70-79 80 or more	Q18 How many people work at your place of work? 1-9 10-99 100+
	Q8 Have you had physical contact with someone diagnosed with coronavirus? (check all that apply)	None that I know of Member of household Family outside household Friend Coworker Cleaning staff/nurse/etc. Patient (in case of medical staff) Client/Customer	Q19 What is your main type of work? Essential services (police, fireman, doctor) Retail large/small Manufacturing Health and social services Hospitality Education Government or defense Construction Transport Administrative assistant and similar Professional, technical, scientist Farming, fishing or other food production Press or communication Domestic care Financial Arts, entertainment, recreation Sanitation, cleaning, garbage collection Other services
Social contact in the last two weeks	Q9 If you have children, are they taken care of by someone outside the home (grandparents, neighbors, etc.)?	Yes No I don't have children	Health
	Q10 Does anyone who doesn't live in your home regularly enter (cleaner, nurse, caretaker, etc.)?	Yes No	Q20 Are you a member of any of these risk groups? (check all that apply) Hypertension Diabetes Cardiovascular disease Respiratory illness Immuno-suppressant Cancer Smoker (current) Smoker (ex) Pregnant Health care worker Not in a risk group I prefer not to answer
	Q11 For what activities do you leave your home? (check all that apply)	Go to hospital Go to a doctor's appointment Go to a health care center (blood test, anticoagulants, etc.) Go to work Go to supermarket help someone that lives outside your home Go to the bank Go to the pharmacy Go to the bakery Go to the newspaper stand Walk the dog Other Stayed home the whole time	Q21 If you were diagnosed with coronavirus, would you be able to isolate yourself from other members in your home? Yes No
	Q12 What means of transport do you use? (check all that apply)	Walk Motorcycle Car (individual) Car (shared) Bike/scooter Public transport (bus, train, etc.) Taxi/Uber/etc. Stayed home	Q22 Do you have any of the following symptoms (more than normal) (check all that apply) Fever Dry cough Productive cough Difficulty breathing Sore throat Headache Muscle pain Loss of sense of smell None of these symptoms I prefer not to answer
			Q23 How long have you had these symptoms? I don't have these symptoms 1 - 3 days 4 - 7 days 8 - 13 days 14 or more days I prefer not to answer
			Q24 Have you taken the test for coronavirus? No, but I don't think I need it No, my doctor recommended it but there weren't any tests available Yes, I'm waiting for my result Yes, the result is I have COVID-19 Yes, the result is I don't have COVID-19 I prefer not to answer

Appendix 2: Summary of Responses

Question 1

Only the answers from Spain with valid postal codes were used.

Question 2 - 3

Q2	Q3		
	(blank)	female	male
(blank)	5	32	24
18 to 20	7	2,067	1,000
21 to 29	27	8,014	4,445
30 to 39	48	14,473	8,408
40 to 49	91	21,029	13,798
50 to 59	92	18,415	12,961
60 to 69	32	9,318	8,292
70 to 79	11	2,115	2,564
80 more		249	263

Question 4

Province in Spain	#Responses
Valencia	55,003
Alicante	29,929
Madrid	8,790
Castellón	8,704
Barcelona	3,643
Murcia	3,219
Albacete	1,584
Málaga	1,324
Sevilla	1,221
Balearic Islands	1,014
Other provinces (less than 1,000)	13,349

Question 5 & 6

Home size	other	Single family	Apartment
(blank)	99	43	118
1	154	3,171	9,184
2	484	10,626	27,011
3	358	11,112	21,554
4	404	13,104	21,082
5more	320	4,406	4,550

Question 7

Age	Number of other household members
(blank)	53
10 or less	14
11 to 20	3,033
21 to 29	11,877
30 to 39	20,869
40 to 49	32,089
50 to 59	28,420
60 to 69	14,856
70 to 79	3,682
80 or more	378

Question 8

Answer	#Responses
No one	108,459
Coworker	6,866
Household member	6,042
Family (outside home)	3,123
Sick patient	3,066
Friend	2,302
Professional client	1,107
(blank)	1,087
Cleaning person / caretaker	642

Question 9

Answer	#Responses
(blank)	124
No	46,947
No children	2,920
Yes	4,598

Question 10

Answer	#Responses
(blank)	491
no	109,402
yes	17,887

Question 11

Answer	#Responses
Supermarket	101,583
Pharmacy	52,069
Work	40,685
Bakery	30,894
Walk the dog	20,795
Help others	14,231
Bank	13,646
Stayed home	11,537
Hospital	6,606
Health center	6,419
Kiosk	6,359
Doctor appointment	4,939
Other	4,502
(blank)	555

Question 12

Answer	#Responses
Walk	71,090
Car individual	70,100
Stayed home	11,383
Car shared	2,873
Public transport	2,684
Motorcycle	1,899
Bike	1,037
(blank)	811
Taxi	774

Question 13

Answer	#Responses
Do more	59,153
Enough	32,667
Don't know	25,159
Don't want to answer	8,256
Too much	2,154
(blank)	391

Question 14

Answer	#Responses
1 month	55,217
2 months	27,092
2 weeks	23,913
6 months	12,784
1 week	3,686
(blank)	3,397
0 days	1,691

Question 15

Answer	#Responses
none	84,556
Lost savings	25,336
Business bankrupt	9,975
Can't pay mortgage	9,133
Lost job	8,264
No food	3,140
(blank)	2,022

Question 16 and 17

Q16	Q17			
	(blank)	no	teleworking	yes
(blank)	277	202	55	86
no	32,542			
student	5,963			
yes	167	28,355	29,446	30,687

Question 18 (blank if Q16 is not Yes)

Answer	Responses
(blank)	40,045
1 to 9	35,262
10 to 99	30,579
100 or more	21,894

Question 19 (blank if Q16 is not Yes)

Field of work	Responses
(blank)	39,016
education	15,309
Other	11,145
Public administration	7,829
Professional	7,522
Essential services	6,880
Health and social worker	6,596
Retail	6,426
Administrative service	4,795
Manufacturing	4,079
Communications	3,164
Hospitality	3,087
Finance	2,804
Construction	2,481
Transport	2,070
Entertainment	1,780
Food production	1,482
Domestic service	760
Sanitation	555

Question 20

Risk factor	#Responses
None	59,910
Smoker	23,030
Ex-smoker	16,104
Hypertension	15,884
Respiratory problems	7,464
Health care worker	7,166
Diabetes	4,641
Cardiovascular disease	4,277
Immunocompromised	2,645
(blank)	2,612
Cancer	2,418
Prefer not to answer	1,673
Pregnant	934

Question 21

Can self-isolate	#Responses
(blank)	583
no	35,883
yes	91,314

Question 22

Symptom	#Responses
none	103,167
Sore throat	7,038
Dry cough	6,117
Productive cough	5,703
Headache	5,090
(blank)	3,885
Muscle pain	3,213
Loss of smell	2,530
Difficulty breathing	1,887
Fever	1,778
Prefer not to answer	741

Question 23

Length of symptoms	#Responses
(blank)	10,702
1 to 3 days	5,351
4 to 7 days	5,117
8 to 13 days	3,879
14 or more	4,458
No symptoms	97,607
Prefer not to answer	666

Question 24

Test result	#Responses
(blank)	3,672
Negative	821
Prefer not to answer	4,752
No need	110,251
No test available	7,661
Positive	386
Waiting for results	237