Title: Public health interventions to mitigate COVID-19 pandemic in Poland - public policies and their social acceptance.

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Abstract:
Poland is a country in Central and Eastern Europe, where over 6.4 million COVID-19 infections and 119,000 related deaths were recorded within 3 years of the outbreak of the COVID-19 pandemic. Public policy aimed at public mitigation of the COVID-19 pandemic changed significantly at different stages of the pandemic. Social behaviors and acceptance of public policies aimed at mitigating COVID-19 also had a significant impact on anti-epidemic measures. This study aimed to characterize public health interventions to mitigate the COVID-19 pandemic in Poland, with particular emphasis on public policies and their social acceptance. Poland reported the first laboratory-confirmed COVID-19 case on March 4, 2020. Within the next few days, all mass events in Poland were banned, all schools and universities were closed, and significant travel restrictions and the 14 days self-quarantine obligation for travelers were introduced. In Poland, compared to other European countries, far-reaching solutions were implemented relatively early to reduce the spread of infection. The first anti-epidemic measures were well-accepted by the public and led to a relatively low burden of the first COVID-19 wave (March-June 2020). In September 2020, when the second wave started, significant public skepticism toward the implementation of anti-epidemic measures was observed. The effectiveness of anti-epidemic measures in the next waves of the COVID-19 pandemic was lower, mostly due to limited public support. On January 2021, a National COVID-19 Vaccination Program was launched. Despite the widespread promotion and free access to the vaccines, the COVID-19 vaccination rate in Poland (60%) is lower compared to other European Union member states (73%). Analysis of social attitudes towards public policies related to COVID-19, in the example of a former communist country like Poland, may inform public policy researchers on factors determining the effectiveness of public
policies in response to public health emergencies.

Keywords: COVID-19; prevention; public health interventions; public policy; Poland

Background

The COVID-19 pandemic posed the biggest public health threat of the 21st Century [1]. Each country around the world reported at least one COVID-19 case [1]. Due to the risk of massive uncontrolled infections and healthcare burdens caused by the COVID-19 pandemic, public authorities were obligated to introduce public policies aimed at mitigating the early spread of the COVID-19 pandemic [2,3]. Most of countries were not ready for the pandemic, and response plans and scenarios were not prepared for respiratory virus infections such as COVID-19 [2,3]. The COVID-19 outbreak was perceived as one of the biggest challenges for public authorities around the world [1]. There was a lack of one global strategy. International public health authorities such World Health Organization (WHO) published guidelines and recommendations but with a little bit of delay related to the ongoing epidemic in member states. There was a lack of one global strategy that could adjust public policies to current urgent needs resulting from massive infections [4]. Public authorities around the world were obligated to introduce national anti-epidemic measures and infection prevention methods. However, public health interventions dependent on national strategies [1-3]. There were different factors affecting COVID-19-related public policies, including socioeconomic factors, historical background, religion, perception of public authorities, and the local situation in a given country [5,6]. However, the impact of socioeconomic factors and national health systems on public policies to address the COVID-19 pandemic has not been sufficiently analyzed. Lessons learned from the COVID-19 pandemic suggest, that there is a need to promote International debate on COVID-19 and evaluation of public policies introduced in response to the COVID-19 pandemic. This is particularly important for low and middle-income countries, where epidemiological surveillance and infection control measures are still developing. However, even within Europen Union, different measures and policies were implemented. The introduction of the „COVID-19 vaccination certificate" and restrictions related to International travel can be perceived as the first public policy related to COVID-19, implemented in all EU member states [7]. Central and Eastern Europe (CEE) is the EU region where the historical and social background may play an important role in the perception of public policies aimed at COVID-19. Public policies aimed at COVID-19 were mostly based on restrictions and governmental interventions in different parts of the business and social activities [2,3]. Due to this fact, public perception and social acceptance of anti-epidemic measures in former communist countries may differ when compared with other EU member states. Poland is a relatively young democracy, gained in 1989 after the communism collapse [8]. Poland is the biggest former communist country in the CEE region, so analysis of the public perception of

public policies aimed at the COVID-19 pandemic in Poland may pose a basis for analysis of social attitudes in the whole CEE region.

Study aim

This study aimed to characterize public health interventions to mitigate the COVID-19 pandemic in Poland, with particular emphasis on public policies and their social acceptance.

Material and methods

This study is a public policy analysis of COVID-19 in Poland. In the first step, epidemiological data on new laboratory-confirmed COVID-19 cases and COVID-19-related deaths were analyzed. Based on the epidemiological data [9], six different waves of the COVID-19 pandemic in Poland have been distinguished:
Wave #1: March-August 2020, with a daily peak of 599 infections reported on June 8, 2020;
Wave #2: September 2020 – January 2021, with a daily peak of 27 875 infections on November 7, 2020;
Wave #3: February – August 2021, with a daily peak of 28 720 infections on March 31, 2021;
Wave #4: September-December 2021, with a daily peak of 23 425 infections on December 7, 2021;
Wave #5: January-April 2022 with a daily peak of 49 077 infections on February 2, 2022;
Wave #6: started on May 2022 and is still ongoing, with two peaks in September 2022 and March 2023.
In the second step, a literature review on public health interventions to mitigate the COVID-19 pandemic in Poland was carried out [10-12]. Particular attention was paid to law regulations passed in response to the COVID-19 pandemic outbreak in Poland. Data on law regulations on COVID-19 were driven from the Journal of Laws and the official websites of the Government of Poland [13].
In the third step, data on social acceptance of COVID-related public policies were collected. Scientific literature was mostly limited to non-representative studies and focused on some local populations [12,14,15]. Wherefore, reports published by the public opinion research agencies were analyzed. Center for Public Opinion Research [16], the official public opinion research agency funded by the public government was selected as a data source because this organization carried out regular follow-up studies on public attitudes towards COVID-19. Social acceptance of public health interventions to mitigate the COVID-19 pandemic in Poland, was analyzed based on the following question: „How, in general, do you assess the government's actions

aimed at combating the COVID-19 pandemic in Poland?", with five possible answers "definitely good, rather good, rather bad, definitely bad, difficult to tell". Data from 30 editions of this opinion poll were included in the analysis [16].

Finally, data on the epidemiology of COVID-19 (6 waves), public policies in force during the particular waves, and social acceptance were combined [9]. Social acceptance of public health interventions to mitigate the COVID-19 pandemic in Poland was analyzed concerning each of the 6 waves of the pandemic. Particular attention was paid to social acceptance of lockdowns and public perception of lifting restrictions.

Poland – social and historical context

Poland is a country located in Central Europe. With an area of 312,679 sq km (120,726 sq mi), Poland is the 9th largest country in Europe [8,17]. The population of Polish people living in Poland is estimated at slightly over 38 million, wherein worldwide there are an additional 15-20 million Poles and people of Polish origin living abroad [17].

The written history of Poland begins in AD 966, after the acceptance of Christianity by Mieszko I, the first sovereign of Poland. On May 3, 1791, Poland adopted the first in Europe (and second in the world after the American) constitution [8]. Between 1772-1795, the Habsburg monarchy, the Kingdom of Prussia, and the Russian Empire conducted partitions and divided Poland's lands among themselves progressively in the process of territorial seizures and annexations [8]. The abovementioned partitions resulted in the elimination of sovereign Poland for 123 years. In 1918 an independent Polish state was restored after the end of WWI. On September 1, 1939, Poland was invaded by NAzigermany, which is recognized as the beginning of WWII in Europe. On September 17, 1939, Poland was also invaded by the Soviet Union [17,18]. During WWII millions of Poles were killed or deported, and major cities in Poland were destroyed. WWII had a significant impact on the history of Poland, leading to huge losses of population, destruction of the economy, and the memories of these events are still strong in Polish society. After WWII, Poland becomes a Soviet Communist People's Republic, under the strong influence of the Soviet Union [18]. The communist regime lasted until 1989, restricting civil rights and liberties. In the times of communism, social movements (including "Solidarność") emerged, opposing the communist regime and the orders formulated by the communist authorities [17,18]. The experiences of the communist period are very strong, especially among older Poles, and significantly influence the behavior of people who lived in those times. In 1989 the communist regimes collapsed, and Poland started a rapid transformation into a democracy [8,17,18]. In 1999, Poland joined the North Atlantic Treaty Organization (NATO). Poland was

also one of 10 new states to join the European Union (EU) in 2004 [17,18]. Accession to the European Union made Poland enter the path of dynamic development, and the differences between the post-communist countries of Europe and the society of Western Europe began to significantly blur. Generations born after 2000 received similar conditions for development and shaping their attitudes as the inhabitants of Western Europe.

Poland has a mono-ethnic society with Poles making up around 97% of the country's inhabitants. Poland is facing significant demographic challenges, as the number of births is constantly decreasing and population aging is ongoing [17]. By 2019, over 2 million foreigners lived in Poland. Since the Russian invasion of Ukraine on February 24, 2022, over 1 million Ukrainian refugees live in Poland. Poland is perceived as a country with a relatively strong influence of religion and a high number of believers - according to the statistics, over 92% of the population is the Roman Catholic. Religious beliefs have a significant impact on public attitudes toward different aspects of social life [5,8].

As religious beliefs and experiences from the communist regime (especially among older adults) continue to have a strong influence on the social attitudes of Poles, International analysis of public acceptance of COVID-19-related public policies should include these factors in international comparisons on public acceptance of anti-COVID-19 strategies implemented in different countries.

Health system review

A rapid increase in the number of infected individuals posed a challenge for national health systems. The organization of the national health system may influence public policies to mitigate the spread of COVID-19. To avoid a shortage of healthcare resources, numerous countries introduced telehealth services, including teleconsultations, particularly in primary care. Nosocomial infections were a significant source of infections during the first wave of the pandemic [10]. A brief analysis of the national health system is necessary to better understand public policies and their implementation from the perspective of national health systems.

The health system in Poland is based on universal, mandatory, publicly operated health insurance [19]. All employed and self-employed (entrepreneurs) individuals are obligated to pay health insurance contributions, in the form of an earmarked payroll tax [19]. Moreover, some groups (including children, pensioners, and pregnant) are covered by the health insurance paid by the state budget. All individuals covered by health insurance may use publicly-funded

health services. Moreover, approximately 30% of expenditures on health care in Poland are covered by private funding (outside health insurance) [19].

Currently, health care system in Poland is based on three levels of care [19]:

– primary care with general practitioners as „entry points” solving basic health problems and serving as gatekeepers to more specialized care;
– specialist ambulatory care providing outpatient ambulatory care;
– hospitals providing 24-hour inpatient care.

Patients with mild to moderate COVID-19 were managed by general practitioners within primary care [20]. Patients with severe COVID-19 or acute deterioration of health status were admitted to the hospitals.

To provide access to healthcare for COVID-19 patients, some hospitals were transformed into COVID-19 dedicated centers [21]. Since the second wave of the COVID-19 pandemic (autumn 2020), dedicated temporary hospitals were opened in sports stadiums and expo halls. Moreover, dedicated regulations on healthcare workers were implemented to limit the risk of COVID-19 transmission by healthcare workers [13]. Organizational changes in the health care system in Poland in connection with the provision of care for patients with COVID-19 resulted in limited access to health care for other patients (non-COVID-19 patients). Previously published data showed that even half of adults in Poland (49.7%) reported barriers to accessing health services during the COVID-19 pandemic [22]. There were concerns regarding the misuse of teleconsultations, especially in primary care. Reorganization of the healthcare system in Poland in response to the COVID-19 pandemic allowed to reduce the number of COVID-19-related deaths, but at the same time that were concerns related to the limitations of access to healthcare for non-COVID-19 patients [20,21].

There are three major public institutions aimed at infectious diseases control and prevention [10]: the Ministry of Health, The State Sanitary Inspection, and the National Institute of Public Health - National Institute of Hygiene. The Ministry of Health (MoH) is the most important government administration official responsible for the organization of health care in Poland. MoH sets the direction of the country's health policy and has control powers. MoH is working on legal acts. The State Sanitary Inspection (pol. “Sanepid”) is a specialized institution performing tasks in the field of public health and epidemiological surveillance. The field branches of the Inspection are Voivodeship (16) or Poviat (318) Sanitary and Epidemiological Stations. Field branches are tasked with infection prevention and control, epidemiological surveillance, administrative decisions on quarantine and isolation, and data collection and

management. National Institute of Public Health - National Institute of Hygiene is a research institute funded by public funds and tasked with public health research, important for the national health policy and data reporting (responsible for reporting to ECDC). The Institute is responsible for data management and analysis necessary to run evidence-based public health policies.

Epidemiology of COVID-19 in Poland

Poland reported the first laboratory-confirmed COVID-19 case on March 4, 2020 [9]. Since the outbreak of the pandemic in Poland, more than 6.5 million infections and almost 120,000 COVID-19-related deaths have been recorded. The COVID-19 fatality rate is estimated at 1.8%. For this study, the COVID-19 pandemic in Poland was divided into 6 waves: March-August 2020 (wave #1); September 2020 – January 2021 (wave #2); February – August 2021 (wave #3); September-December 2021 (wave #4); January-April 2022 (wave #5); and wave #6 started on May 2022 and is still ongoing, with two peaks in September 2022 and March 2023 [9]. The number of COVID-19-related deaths reported in Poland was in line with the course of the COVID-19 pandemic, except for the first wave, where a relatively high number of deaths was reported. During the first wave of the pandemic, a relatively high percentage of nosocomial infections and those related to outbreaks of infection in workplaces were observed [10]. In the next waves, there were massive outbreaks in different settings, without one clearly defined source of infection. When compared to Western Europe, a significant COVID-19 burden and excessive mortality were observed in Poland [9].

Public health interventions to mitigate the COVID-19 pandemic in Poland and social acceptance of public policies

Different measures and social behaviors during subsequent waves of the COVID-19 pandemic were implemented. During the first wave (March-August 2020) a massive lockdown was implemented. On March 2, the Lower Chamber of the Polish Parliament (Sejm) enacted the Crisis Act on special measures aimed at the prevention and control of COVID-19, other infectious diseases, and the resulting crises [13]. On March 9, Poland introduced border sanitary control. Within the next few days, all mass events in Poland were banned, all schools and universities were closed, and significant travel restrictions and the 14 days self-quarantine obligation for travelers were introduced [10]. In Poland, compared to other European countries, far-reaching solutions were implemented relatively early to reduce the spread of infection. All schools and universities were closed 8 days after the first COVID-19 case. Eleven days after

the first COVID-19 case, controls at all Polish borders were introduced, and a ban on entry into Poland by foreigners (with some exemptions) was implemented [10]. Limits on the number of people in selected places were introduced. Individuals with laboratory-confirmed COVID-19 were obligated to comply with mandatory isolation and those who had close contact with infected individuals were obligated to undergo 14-day quarantine. Compliance with isolation and quarantine was verified by police officers, supported by the military [10]. The percentage of quarantine violations was less than 0.5%. The first lockdown was well-accepted by the public, with 70% of supporters in May. Since the beginning of May, lockdown measures were abolished and during summer time (June-August), Poles started holidays (with some limitations related to the limits in restaurants, hotels, and entertainment facilities). During the first wave of the pandemic, the percentage of Poles who do not agree with the public policies aimed at COVID-19 varied from 25% in May to 36% in August 2020 [16].

Lifting restrictions during summertime, the holiday season, and related travels, as well as school reopening caused the second wave of the COVID-19 pandemic. In the middle of August regionalization of anti-epidemic measures was implemented and administrative regions in Poland were divided into three categories based on the COVID-19 incidence "green", "yellow" and "red" zones [13]. During the second wave of the pandemic up to 27,500 infections per day were reported [9]. In October second national lockdown (including distance learning, closure of restaurants, entertainment facilities, and selected types of businesses) was implemented. General hospitals and selected wards were transformed into COVID-dedicated centers, which also worsen access to healthcare for non-COVID patients. The introduction of the second lockdown resulted in a rapid decrease in social acceptance (from 55% to 38%) of public policies. More than half of Poles (55%) were against the second lockdown, and numerous violations of public policies were reported [16]. On December 28, 2020, the first dose of COVID-19 vaccine was administered. The National COVID-19 Vaccination Program was announced, with healthcare workers as a priority population for the COVID-19 vaccine. A National Vaccination Program was age-based, and the first doses to the oldest population were administered in January. After the announcement of the COVID-19 vaccination program, the percentage of opponents decreased from 55% in October to 45% in January 2021 [16].

The third wave of the COVID-19 pandemic in Poland lasted from February to August 2021 [9]. Due to the limited number of vaccines in the first months of 2021, there was a high risk of COVID-19 transmission among younger adults and children. On 10 May 2021, all Polish inhabitants aged 18 and over could register for a COVID-19 vaccination [13]. In 2021, a growing number of researchers reported new emerging SARS-CoV-2 variants. The peak of the

third wave was on March 31, 2021, with 28,700 new cases reported [9]. In March the third national lockdown (including distance learning, closure of restaurants, entertainment facilities, and selected types of businesses) was implemented. This lockdown also covered Easter and resulted in canceled family gatherings related to the religious celebration in Poland. The scope of restrictions was comparable to those implemented in 2020. Half of the Poles were against the third lockdown [16]. Restrictions were abolished on May 2021 [13]. After lifting the restrictions, a dynamic decrease in the percentage of opponents was observed from 49% in April to 39% in May [16].

Similar to 2021, lifting restrictions during summertime, the holiday season, and related travel, as well as school reopening caused the next wave of the COVID-19 pandemic. The fourth wave was observed between September and December 2021, with a peak of infection (23,400) on December 7, 2021 [9]. On November 2021, the third COVID-19 vaccination (booster dose) was launched, which was in line with the international recommendations on COVID-19. A rapid increase in COVID-19-related vaccine hesitancy and anti-vaccination movements was observed during the fourth wave of the COVID-19 pandemic [9]. Due to the growing number of opponents of public policies on COVID-19, ongoing COVID-19 vaccination programs as well as economic costs of lockdowns, public authorities decided to introduce partial lockdowns. Public policies and restrictions were limited to emerging locations (e.g., massive gatherings and entertainment facilities) [13]. Limitations of the public policies and lockdowns lead to stable support for the public policies declared by over 50% of Poles. The Omicron variant was responsible for the rapid increase in the number of COVID-19 cases in the last weeks of 2021. A new rule related to the omicron variant announced in December, lead to an increase in the percentage of opponents (56%) [16].

The fifth wave (January-April 2022) of the COVID-19 pandemic in Poland was directly related to the occurrence of a new omicron variant [9]. Despite the high COVID-19 incidence, public authorities limited funding of the PCR test and focused on rapid antigen tests and self-detection of COVID-19 by patients using tests both in pharmacies. In January 2022, cumulative uptake of the primary course of COVID-19 vaccination in Poland was lower than the EU average (60% vs. 73%) [16]. On January 2020, the mandatory quarantine was limited to 7 days. Moreover, public authorities paid less attention to COVID-19, despite the high COVID-19 incidence (up to 48,000 infections/day) [9]. During the fifth wave, a high number of infections, but a relatively low number of hospitalizations and deaths was observed. On March 28, 2022, mandatory quarantine was abolished, and facemask-wearing regulations were limited to healthcare facilities [13]. After the Russian invasion of Ukraine (February 24, 2022), public authorities in

Poland were mostly focused on security issues and the organization of humanitarian aid and help for Ukrainian refugees. During the first wave of the pandemic a subsequent decrease in the percentage of public policy opponents (from 53% to 44%) [16].

On April 16, 2022, daily reports on new COVID-19 cases were replaced with weekly reports. In May 2022, the state of the epidemic was replaced with the state of epidemic emergency (lower risk of emergencies) [13]. Since July 2023, the state of epidemic emergency will be abolished. During this wave, two peaks of infections were observed in September 2022 and March 2023. Despite the free access to COVID-19 vaccines, a lack of progress in the COVID-19 vaccination program was observed in 2023. Currently, in Poland, COVID-19 is perceived as a „common infection like flu" [13].

Two key actions decreased the level of fear of COVID-19 among adults in Poland [16]. In May 2021, universal access to COVID-19 vaccines was launched, and between April and June 2021, the percentage of Poles who were afraid of COVID-19 decreased from 64% to 48%. On January 2022, numerous countries lifted COVID-19 restrictions and people could back to international travel. Also, Poland reduced restrictions related to quarantine and anti-epidemic measures. Between January and March 2023, the percentage of Poles who were afraid of COVID-19 decreased from 58% to 43% [16].

Policy evaluation

The COVID-19 pandemic was the first global public health threat in the 21st Century, that obligated public authorities to implement public health interventions to mitigate the COVID-19 pandemic. The health consequences of long-COVID-19 are unknown. Moreover, there is a lack of clearly defined information on whether COVID-19 will disappear or will be seasonal as influenza.

This policy evaluation is focused on five strengths and five limitations of COVID-19-related public policies in Poland. Rapid response (Crisis Act before the first laboratory-confirmed COVID-19 case) to the first wave of the COVID-19 pandemic should be noted. Law regulations were implemented before the laboratory detection of the first COVID-19 case, which posed a good basis for further public health interventions. During the first wave of the COVID-19 pandemic, a high acceptance of the first lockdown and compliance with anti-epidemic measures was observed. This may result from the phenomenon that Poles can unite and act for the common good in the event of a crisis or a significant threat to security (in this case, to health security). Universal access to COVID-19 vaccines should be also listed as a strength of the public policy. Public authorities passed a law to ease access to vaccinations, including

pharmacy-based vaccination programs. COVID-19 vaccination was contracted as a separate procedure, so healthcare providers were interested in the COVID-19 vaccination program for local communities. During the whole pandemic in Poland, public authorities regularly increased the capacity of the health system and COVID-19 dedicated resources. This partially resulted in limited access for non-COVID-19 patients, but there was no massive situation with a lack of access to healthcare services for patients with severe COVID-19 or acute exacerbation. Moreover, during the whole pandemic, public authorities launched numerous economic programs that provided economic support for the businesses affected by lockdowns (so-called „anti-COVID-19 financial shield"). Thanks to this support numerous companies could keep operating and mass layoffs were avoided.

Despite the successful response to the first wave of the COVID-19 pandemic, there were numerous concerns related to the limitations of the public policies aimed at COVID-19 in Poland. The most important one was the lack of a clearly defined strategy. Public policies have changed numerous times, without clearly defined major goals and other relevant goals. For sure, the protection of humans was the most important goal, but there was a lack of strategy related to social life and the economy. Communication mistakes and lack of explanation of the reasons for introducing restrictions were the second most important thing. New policies were presented on slideshows during the press conferences of governmental authorities, without explanation of the decisions (e.g., closure of selected branches of the economy) and comments from experts in the field. Communication mistakes lead to a significant percentage of Poles who neglected COVID-19-related public policies and did not comply with the regulations, especially during the third lockdown. It should be also noted, that since the third wave, restrictions have been tailored to public expectations, with less input from experts. Lack of clear communication and making decisions by politicians contributed to the low COVID-19 vaccination uptake in Poland. COVID-19 vaccination uptake in Poland is lower than in the EU. Inefficient resource management, including partial paralysis of the health system and mass purchases of unused materials, should be also noted as a limitation of the public policy related to COVID-19. The purchase of the wrong medical equipment or the creation of temporary hospitals in some regions that were inefficient from a healthcare resource management perspective are prime examples of poor resource management during the pandemic.

Conclusions

During the first wave of the COVID-19 pandemic in Poland, public policies were well-chosen and supported by the public. In subsequent waves of the pandemic, social support for public

policies decreased, especially with the second lockdown at the end of 2020. The historical background and experiences of regaining freedom and democracy in 1989 may be one of the factors determining the lack of public support for orders and restrictions. Public policy and anti-epidemic measures should be accompanied by communication activities based on experts in the field rather than politicians. Analysis of social attitudes towards public policies related to COVID-19, in the example of a former communist country like Poland, may inform public policy researchers on factors determining the effectiveness of public policies in response to public health emergencies

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