Chapter

Covid-19 Vaccines and Institutional Trust

Fermín Jesús González-Melado and María Luisa Di Pietro

Abstract

Major public and private laboratories entered into a race to find an effective Covid-19 vaccine. With the arrival of the vaccines, governments have to implement vaccination programs to achieve the necessary immunization levels to prevent further transmission of the disease. In this context, the ethical dilemma of compulsory vaccination *vs*. voluntary vaccination has been raised. Underlying this dilemma lies the problem of the ethical models on which the political decisions of governments in health matters based. The chapter proposes and argues the need to base health policy decisions on an ethical "first person" model, based on personal responsibility, that allows us to move from a normative ethic to an ethic of responsible behavior. This change in the ethical model, together with certain proposals for political action, will help us to restore institutional trust, so that the necessary levels of collective immunity against Covid-19 can be achieved through the voluntary vaccination of the citizens.

Keywords: Covid-19, vaccination, ethics of responsibility, prevention, institutional trust

1. Introduction

While we are still suffering the effects of the Covid-19 pandemic, the major public and private laboratories have entered into a race to find an effective vaccine against Covid-19. A vaccine capable of generating immunity is the only tool that can stop the spread of the virus. As of April 20, 2021, 13 vaccines have been approved and used, and there other 60 vaccine development projects worldwide [1]. The development of these vaccines has posed some serious ethical problems. Some groups were carrying out safety and efficacy tests on animals and humans in parallel, when the normal procedure would be to carry out the tests in animals and, once safety and efficacy have been proven, to carry them out in humans [2, 3]. Other groups had planned to inject the virus directly into healthy volunteers to test the efficacy of the vaccines [4]. In April 2020, the best forecasts spoke of a vaccine by the end of the year, and others by mid-2021 [5]. As we have already said, by mid-April 2021, we have 13 vaccines that are being applied all over the world. The truth is that each country, when the vaccines arrive, will face two successive scenarios: at first, two or three vaccines will arrive which have passed the safety and efficacy clinical trials, but with a limited production that will not allow the vaccination of the entire population; later, when the safety and efficacy of the first vaccines have been verified in the vaccinated population, the production of the most effective and safe vaccines will be increased, and the mass vaccination of the population can be considered [6].

In the first moment, when there is a shortage of available vaccine units, the ethical dilemma that arises is: whom to vaccinate? When there is a shortage of health resources, decisions must be made according to the principle of distributive justice, and the criteria for inclusion (prioritization) of the groups of users who can access vaccination will have to be determined.

In the second stage, when vaccine production has increased, mass vaccination of the population will be considered. In regard to the implementation of mass vaccination, two basic ethical dilemmas arise: the first is that of "free vaccination" *vs.* "paid vaccination"; the second is that of "non-compulsory vaccination" *vs.* "compulsory vaccination". In the case of vaccination against Covid-19, it is clear that the concern will focus on mass immunization, and as a rule, governments will carry out vaccination at no direct cost to citizens, thus eliminating the first dilemma. In this context, the only ethical dilemma that will arise will be compulsory *vs*. non-compulsory vaccination.

In this chapter, we aim to demonstrate that underlying these dilemmas are a series of ethical models on which the political decisions of governments about health matters are based. From there, we propose and argue the need for a "first-person" ethical model, based on responsibility, which allows us to move from a normative ethics to an ethics of responsible moral behavior, and which, together with certain proposals for political action, will succeed in recovering institutional confidence so that the necessary levels of collective immunity against Covid-19 can be achieved through the mass and voluntary vaccination of citizens.

2. Whom to vaccinate?

In the midst of a veritable forest of vaccine research projects, three are leading the way [7]. Therefore, a first scenario is presented with three or four approved vaccines with relative safety and efficacy, enough to reduce mortality, infections and the need for hospitalization. Thereafter, it will be necessary to initiate worldwide production of them in unprecedented quantities. Some centers expect to produce 100 million vaccines per year, while the alliance between various international organizations is talking about achieving 2 billion doses per year. Despite all these efforts to expand production, it is certain that, initially, there will not be enough vaccine for everyone, and governments will have to decide whom to vaccinate as a priority.

Given the lack of availability of health resources, in this case vaccines, *the principle of equal access* to them cannot be applied. The *principle of equity* then appears. Equity is *distributive justice* understood not as the equal distribution of resources, but as justice in relation to needs, especially in the distribution of risks and benefits in society. Following this principle, at least two groups appear in the risk/benefit ratio, and should be the target of the first group of available vaccines: health professionals and users of the health system over 70 years of age.

During the first wave of the Covid-19 pandemic, we have seen in different countries that a large number of health workers has been infected. The infection of such workers has had important consequences for the management of hospitals and the care of patients [8]. Those over 70 years of age have the highest mortality rate from Covid-19 [9]. During the first wave, in some European countries, 66% of deaths officially attributed to COVID were in this population group. The specific case of nursing homes [10] was particularly dramatic, as stated by the WHO [11]. In this sense, the elderly over 70 years of age and those living in nursing homes, as well as their caregivers, should be included in the priority group from the first moment of vaccination.

3. Compulsory vaccination?

Both in the first stage, of priority vaccination of risk groups, and in the second stage, that of mass vaccination once the production problems have been overcome, the possibility of compulsory vs. voluntary vaccination will be raised. Compulsory vaccination is an ethically controversial decision because it affects individual rights, including the individual's right to self-determination about health matters. Consider the case of a healthcare professional who refuses to be vaccinated when the government wants to force all healthcare workers to be vaccinated. Would a government be obliged to assume the responsibility for possible side effects caused by such mandatory vaccination? It is clear that if, for example, a government forces health professionals to be vaccinated, the legal responsibility would be that of the government, which would be obliged to pay the corresponding indemnities in the event that these vaccinations produce serious side effects for the health of those vaccinated. On the other hand, it has been shown that, even in situations of serious infections, merely recommending a vaccine, instead of making it mandatory, has not produced good immunization results [12]. In the event that there are people who refuse to be vaccinated against Covid-19, can a government force them to be vaccinated? [13].

3.1 Ethical models in national health systems

Behind the question of whether or not vaccination should be obligatory lies a much broader debate, one that refers to the ethical model of reference when making political decisions about public and community health issues. The first model is that of a normative ethics (a third-person ethics) that defends the legal obligatory nature of vaccination. The second model is that of virtue ethics (a first-person ethics), which defends the individual protagonist in making decisions about his or her health, taking into consideration the realization of the common good of society through the realization of the personal good. We propose that when making public health policy decisions in regard to Covid-19, it is possible to move from a normative ethics to a virtue ethics, through an ethics of personal responsibility [14].

The objective of a normative ethics, or a third-person ethics, is the search for and establishment of a series of rules or moral norms to be observed when carrying out certain individual actions. Human action is thus governed by norms that disregard the subject who acts and express his own existence. The object of investigation of this ethics is neither how one "should" live nor what would be the desirable lifestyle, but only whether a certain action is licit or illicit from the observation of an external judge: the "third person".

However, any conscious choice on the part of the individual, such as whether or not to be vaccinated against Covid-19, must be based on so-called " the first-person ethics", i.e., the search for the good of human life in its globality and complexity. Ethics would thus come to be configured as a kind of "discussion" on different lifestyles and different ways of living, and only secondarily on individual actions, with the aim of establishing what is the best life to lead and to desire.

3.2 "Responsibility" as an alternative

An appropriate way to move from a third-person ethics to a first-person ethics is a new reading of Hans Jonas' "ethics of responsibility" [15]. Jonas presents the personal responsibility and duty towards the children we have begotten, and who would perish without the care they need, as the clearest example we find in everyday morality of a non-reciprocal elementary responsibility and duty, which are spontaneously

recognized and practiced. Jonas locates the origin of the idea of responsibility not in the relationship between autonomous adults, but in this relationship with offspring in need of protection. For Jonas, parental care for children is the archetype of responsible action. This archetype does not need to be deduced from principles, but is implanted in all of us by nature.

Along with parental responsibility, Jonas posits politics as another fundamental form of responsibility. Political responsibility and parental responsibility, although different, have the most in common. Jonas posits five elements in which these responsibilities coincide: *totality, object, sentiment, continuity*, and *future*. This last common element, the future, shows that in both parental and political responsibility, tomorrow is included in today's concerns. In the context of total responsibility, every individual act that is concerned with the immediate also includes, as its object, the future existence of that child or that community. In this sense, personal responsibility cannot be determining but *enabling*; it must prepare the ground for the future and keep the greatest number of options open. It is a matter of keeping open the future of the subject for whom one is responsible, be it the future of the child, or of the individual who is part of the social community.

4. The concept of prevention

For this to be possible, governments and health authorities must change the concept of prevention that they normally use. In regulatory ethics, which would support, for example, mandatory vaccination against Covid-19, the concept of prevention is identified with *risk reduction*. In this sense, a health system will achieve better prevention when the risk of contracting the disease is lower. In the case of vaccination against Covid-19, this will occur when the greatest possible number of individuals is vaccinated. This is an argument that, from a normative ethical point of view, would justify vaccinating as many people as possible against Covid-19 on a compulsory basis.

However, from the point of view of a normative ethics, all preventive medicinal measures, including vaccination against Covid-19, run the risk of becoming a set of *obligations* and *prohibitions* for citizens. These obligations and prohibitions can increase frictions between political decisions and the individual autonomy, and can increase personal frustrations, because these preventive measures are perceived only as an instrument for the good of society. Even worse, they can also potentially lead to a lack of motivation in regard to everything else related to one's own health.

We propose a different concept of preventive medicine. For us, prevention consists in *the acquisition by the individual of ethical behaviors* - this is the novelty with respect to the thought of Hans Jonas - that allow the development of the person towards a "first-person ethics" in the attainment, in general, of his or her own good, and in the particular case, of that which, as Descartes had already observed, is the "greatest" of one's goods: health.

If citizens move from this perspective of personal responsibility in the pursuit of the collective health, compulsory vaccination against Covid-19 would be unnecessary: if the efficacy and the medical and social value of the new Covid-19 vaccines are guaranteed, and citizens are properly informed, vaccination would be, so to speak, a "moral responsibility," a moral duty [16], and vaccination would be one more among the actions that direct the individual towards the achievement of both individual and community health. We believe that, through a first-person ethics, it is possible to create an alternative based on personal responsibility, one that, together with a series of legal actions of a political nature that we will enunciate

below, allows effective protection of the entire community and, at the same time, guarantees the expression of personal autonomy. For example, in order to institute confinement, a regime of sanctions was established by the government (normative ethics), but what has allowed confinement to have a high success rate has been the concept of prevention based on personal responsibility, exercised by the citizens according their own determination to cooperate, in a responsible manner, with the prevention measures (first-person ethics).

5. Is there a right to not be vaccinated?

The principle of respect for the autonomy of the individual, enshrined in the Spanish Patient Autonomy Law [17], allows the individual to refuse a treatment and, therefore, also to refuse vaccination [18]. It is clear, therefore, that an individual has the right to choose not to be vaccinated. It is also true that some legislation in democratic countries contemplates the possibility of compulsory vaccination in exceptional circumstances. For example, in Spain, Organic Law 3/1986, of April 14, 1986, on *Special Public Health Measures*, allows the approval of exceptional measures, such as compulsory vaccination, when there is a specific risk to the health of the population, such as an epidemic outbreak [19]. Knowing all this, we cannot forget that vaccination is a treatment applied to healthy people who are not suffering from a disease. Moreover, in the case of Covid-19, a large part of the population, those under 20 years of age and without previous health complications, has a very low percentage of serious complications. Therefore, the medical justification for vaccination, in many cases, would not be based so much on the protection of the individual as on the protection of the community (herd immunity) [20].

Before promoting compulsory vaccination protocols against Covid-19, the question which should be asked is: why is the percentage of individuals vaccinated voluntarily so low even in pandemic situations, as demonstrated with the H1N1 virus? Or, in other words, why does a person refuse a vaccine that could save his or her life?

In August 2017, France's health minister reported a decision to mandate vaccination against 11 diseases for minors starting in 2018. This measure was taken due to alarming data on low vaccination rates for diseases such as measles among the population of France [21]. In Spain, where vaccination is not compulsory, vaccination rates are among the best in Europe in the child population (between 95 and 98% for childhood vaccines), dropping slightly with those administered during adolescence (especially in booster doses). The lowest data belong to seasonal influenza vaccination (54% in 2018).

The French case is not unique in Europe. Other European countries are seeing their vaccination rates decrease year after year [22]. Several factors have led to a change in the perception that part of the population has about vaccines [23]: a feeling that the economic and business motives of large pharmaceutical companies which put pressure on public institutions and governments are more important than healthcare [24]; the belief that user deaths are directly related to vaccines rather than mere coincidences [25]; the sometimes alarmist communication of risks and side effects in the media [26]; healthy individuals are, in general, more fearful of the risk caused by vaccines than of the use of the drugs that treat that disease, because the decline in the number of diseases against which vaccines are given has distorted the perception - through ignorance - of the seriousness of many of them (this was seen during the measles outbreak in European countries two years ago) [27]; there is a certain distrust in scientific knowledge, which seem to change and be surpassed with each new discovery [28].

In the specific case of Covid-19, the two scenarios given above will give us different situations in regard to public trust. On the one hand, the first vaccines to be put into circulation will not necessarily be the most effective or the safest. This may lead some people to doubt whether or not to administer the vaccine. On the other hand, at the second stage, that of mass vaccination, the efficacy data of previous vaccines will be available, and the vaccine with the best safety and efficacy data can be administered, thus increasing the population's trust in the vaccines. In the scenarios described above, we may find different vaccines in different countries or even in different regions within the same country. In addition, trust in vaccines will depend on the evolution of the *fake news* that promote conspiracy theories about Covid-19 and vaccines against the virus. All these factors will affect the levels of trust/distrust of the population towards institutions and towards vaccines against Covid-19.

6. The problem of institutional trust

Public trust in public health systems is critical, and affects the development and maintenance of individual, community and societal health and well-being. This is why health professionals, and especially politicians, need to take the concept of "institutional trust" seriously [29] if they want to improve both the commitment to health among the general population and their public health systems.

Both theoretical and empirical literature show that contemporary societies are built on very low levels of trust [30, 31]. In our societies, there are two types of trust: interpersonal and institutional. Interpersonal trust appears as the result of past interactions by which people learn to make decisions about future interactions; i.e., the individual, from his past experiences, learns whether or not to trust someone else in the future. "Institutional trust" refers to the trust placed by individuals in a system or institution such as a government, a political party, a non-governmental organization, or a particular public or private organization. Institutional trust is based on personal experiences, especially negative ones, that the person has had throughout his or her life, not so much with the institution, but with the people who represent the institution [32]. Research shows that in crisis situations, interpersonal trust tends to increase and institutional trust decreases [33].

Institutional trust is one of the most important concerns when carrying out mass vaccination campaigns [34], not so much because users distrust the public health system, but because they distrust government recommendations [35]. Maintaining institutional trust is critical for mass immunization programs against Covid-19. A clear example of this problem is the low levels of vaccination during the H1N1 pandemic; the lack of trust in the institutions involved in vaccination during the H1N1 pandemic led to an increase in vaccination skepticism. This, together with conspiracy theories, and speculation that the response to the pandemic by governments had been influenced by the commercial interests of big pharma, led to a disastrous failure in immunization levels in most countries [24]. It is clear that in the current period, both interpersonal and institutional trust have undergone changes. Studies point to an increase in interpersonal trust and a decrease in institutional trust during the Covid-19 pandemic [36]. It is necessary to increase the levels of institutional trust when vaccination processes are initiated, both at the first moment, when vaccination is restricted to risk groups, and at the second moment, when vaccines are available for the rest of the population. The recovery of institutional trust will be a key element in achieving vaccination levels that allow herd immunity.

7. Proposals for political action

From a first-person ethics based on personal responsibility, at least two changes are needed before the relevant governments will consider mandatory mass vaccination programs against Covid-19.

The first change is to *rediscover the leading role of each citizen in prevention policies, and more specifically in health decisions*. It is not up to the government to decide for the individual; it is up to the individual himself to evaluate whether, when he makes the decision not to vaccinate himself, he does so with the aim of preserving his health and the health of the community. From this point of view, from an ethics of the first person, the subject will understand that it is his moral responsibility to be vaccinated against Covid-19, because vaccination is a valid instrument in the objective of achieving the good of "health" at both the individual and community level.

The second change focuses on the role of governments. It is *the responsibility of governments to promote prevention policies based on the ethics of individual responsibility* in order to increase institutional trust and, therefore, a reduction in the possible distrust towards vaccination against Covid-19. It is clear that when a person decides not to be vaccinated, it is not with the intention of transmitting the disease, but out of fear and mistrust that the vaccine will be useful for his or her health. For this reason, responsible governments must implement a series of initiatives aimed at reinforcing institutional trust:

- ensure a policy of correct scientific information on the efficacy and safety of vaccines against Covid-19. John M. Barry wrote: "In the next influenza pandemic … the single most important weapon against the disease will be a vaccine. The second most important will be communication" [37];

- provide for the preparation of well-trained health professionals to offer vaccination to users of health systems, especially family physicians and pediatricians;

- eliminate socioeconomic barriers to allow access to the Covid-19 vaccination program for the entire population;

- prepare an adequate disease control system, both at regional and national level, and;

- provide for a responsible agency, at the political and scientific level, for the introduction, distribution and follow-up in the public health system of the new Covid-19 vaccine(s), both at the first moment of vaccination, of populations at risk and at the second moment, when the vaccine becomes available to the rest of the population.

These are all concrete actions that we propose to increase the population's institutional trust when vaccine(s) against Covid-19 are presented. These measures will help each individual to assume his or her personal responsibility both in the first scenario, of priority vaccination (health professionals + risk groups), and in the second moment, in the mass vaccination campaign. These measures will make it possible to guarantee the necessary immunization levels against Covid-19 with voluntary vaccination.

8. Conclusions

Before the responsible governments, both at the national and regional levels, promote vaccination campaigns against Covid-19, in the different scenarios that are foreseen in the future, it will be necessary to increase the levels of institutional confidence in the population, in order to guarantee the success of vaccination program(s). Only in this way will it be possible to achieve the desired levels of immunization in the population during this pandemic situation. This will only be possible if, together with the concrete measures that we have proposed to be implemented by the different governments, a concept of prevention is promoted which encourages individual ethical behavior aimed at achieving the good of health for both the individual and for his or her community. This concept of prevention, based on individual responsibility, must include all preventive measures in the spread of Covid-19, including vaccination measures. The success of future vaccination programs against Covid-19 will depend on the assumption of this ethic of responsibility, not only by individuals, but also by the various governments involved.

Acknowledgements

We thank Dr. José Manuel Moreno Villares for his review of the final version of the manuscript and his suggestions for the final draft of the text.

Conflict of interest

The authors declare no conflict of interest.

Author details

Fermín Jesús González-Melado[1*] and María Luisa Di Pietro[2]

1 Department of Moral Theology and Bioethics, High Center for Theological Studies (Badajoz), Pontifical University of Salamanca, Salamanca, Spain

2 Hygiene Section, University Department for Life's Sciences and Public Health, Università Cattolica del Sacro Cuore, Rome, Italy

*Address all correspondence to: fjgonzalezme@upsa.es

References

[1] Craven J, Covid-19 vaccine tracker. Regulatory Affairs Professionals Society (RASP) Published online on April 15, 2020: https://www.raps.org/news-and-articles/news-articles/2020/3/covid-19-vaccine-tracker [Accessed 20/4/2021].

[2] Boodman E. Researchers rush to test coronavirus vaccine in people without knowing how well it works in animals. Published online https://www.statnews.com/2020/03/11/researchers-rush-to-start-moderna-coronavirus-vaccine-trial-without-usual-animal-testing/ [Accessed 20/4/2021].

[3] Plotkin SA, Caplan A. Extraordinary diseases require extraordinary solutions. Vaccine. 2020; 38:3987-3988. DOI:10.1016/j.vaccine.2020.04.039.

[4] Eyal N, Lipsitch M, Smith PG. Human challenge studies to accelerate coronavirus vaccine licensure. J Infect Dis. 2020;221:1752-1756. DOI: 10.1093/infdis/jjaa152.

[5] Kelly-Linden, J. University of Oxford Covid-19 vaccine. The Daily Telegraph. Published online on April 29, 2020: https://www.telegraph.co.uk/global-health/science-and-disease/oxford-vaccine-trial-coronavirus/ [Accessed 20/4/2021].

[6] Shumeni, L. COVID-19 vaccine development lab, production department completed in Wuhan. Goblal Times. Published online on July 2, 2020: https://www.globaltimes.cn/content/1193263.shtml [Accessed 20/4/2021].

[7] World Health Organization. Draft landscape of COVID-19 candidate vaccines. Published online on July 2, 2020: [https://www.who.int/publications/m/item/draft-landscape-of-covid-19-candidate-vaccines] [Accessed 20/4/2021].

[8] O. Guell, "España es el país con más contagios entre el personal sanitario", *El País*. Published online on April 25, 2020: [https://elpais.com/sociedad/2020-04-24/espana-es-el-pais-con-mas-contagios-entre-el-personal-sanitario.html [Accessed 20/4/2021].

[9] Coronavirus: case fatality rate by age. Published online https://ourworldindata.org/mortality-risk-covid [Accessed 20/4/2021].

[10] RTVE noticias. "Radiografía del coronavirus en residencias de ancianos: más de 19.000 muertos con Covid-19 o síntomas compatibles". Published online on May 22, 2020: [https://www.rtve.es/noticias/20200528/radiografia-del-coronavirus-residencias-ancianos-espana/2011609.shtml [Accessed 20/4/2021].

[11] Europa Press. La OMS calcula que 55.000 ancianos han muerto con covid-19 en geriátricos de Europa. elPeridodico. Published online April 23, 2020: https://www.elperiodico.com/es/sociedad/20200423/oms-calcula-55000-ancianos-muerto-covid-19-geriatricos-europa-7938134] [Accessed 20/4/2020].

[12] Doganis D, Tsolia M, Dana H, et al. Compliance with immunization against H1N1 influenza virus among children with cancer. Pediatr Hemat Oncol. 2020;30;149-153. DOI: 10.3109/08880018.2012.753961.

[13] Wiwanitkit S, Wiwanitkit V. Compulsory vaccination: a topic to be discussed. Cuad Bioet 2013; 80: 127.

[14] Di Pietro ML, Refolo P, González-Melado FJ. Sobre la 'responsabilidad' de la vacunación. Cuad Bioet. 2012;78:323-336.

[15] Jonas H, Das Prinzip Verantwortung. Versus einer Ethik für die technologische Zivilisation,

Shurkamp, Frankfurt am Main 1979. English translation: The imperative of Responsibility. In Search for an Ethics for the Technological Age. The University of Chicago Press. Chicago, 1984.

[16] Refolo P, González-Melado FJ, Di Pietro ML. Sulla 'doverosità morale' dell'uso di vaccini. Clin. Ter. 2015:162;38-42.

[17] Ley 41/2002, de 14 de noviembre, básica reguladora de la autonomía del paciente y de derechos y obligaciones en materia de información y documentación clínica. BOE núm. 274, de 15/11/2002. Reference BOE-A-2002-22188. Published online: https://www.boe.es/buscar/act.php?id=BOE-A-2002-22188.

[18] Miller BL, Autonomy, in Post SG (ed.), Encyclopedia of Bioethics, Thomson, New York 2003, 246-251, p. 247.

[19] Ley Orgánica 3/1986, de 14 de abril, de Medidas especiales en materia de salud pública. BOE núm. 02, de 29/04/1986. Reference BOE-A-1986-10498. Published online: https://www.boe.es/buscar/act.php?id=BOE-A-1986-10498.

[20] Ludvigsson JF. Systematic review of COVID-19 in children shows milder cases and a better prognosis than adults. Acta Paediatr. 2020;109:1080-1095. DOI: 10.1111/apa.15270.

[21] Perez Avila, M. La caída en las tasas de vacunación provoca un fuerte brote de sarampión en Europa. El Mundo. Published online on August 5, 2017: https://www.elmundo.es/ciencia-y-salud/salud/2017/08/05/596e4743468aebb30b8b46a9.html [Accessed 20/4/2021].

[22] Dawson, A. Herd protection as a public good: vaccination ad our obligation to others, in Dawson A, Werweij M. Ethics prevention and public health, Clarendon Press, Oxford, 2007, p.160-178.

[23] Larson HJ, Cooper LZ, Eskola J, et al. Addressing the vaccine confidence gap. Lancet. 2011;378:526-535. DOI: 10.1016/S0140-6736(11)60678-8.

[24] Yaqub O, Castle-Clarke S, Sevdalis N, Chataway J. Attitudes to vaccination: a critical review. Soc Sci Med. 2014;112:1-11. DOI: 10.1016/j.socscimed.2014.04.018.

[25] Lon Z, Puliyel JM. Introducing prevalent vaccine in the EPI in India: a counsel for caution. Indian J Med Res. 2010; 132:1-3.

[26] Campbell P. Understanding the receivers and the reception of science's uncertain messages. Philos Trans A Math Phys Eng Sci. 2011;369:489-4912. DOI: 10.1098/rsta.2011.0068.

[27] Doteval L. The return of measles to Europe highlights the need to regain confidence immunization. Acta Paediatr. 2019;108: 8-9. DOI: 10/1111/apa.14621.

[28] Clements CJ, Ratzan S. Misled and confused? Telling the public about MMR vaccine safety. J Med Ethics. 2003;29:22-26.

[29] Ward PR. Improving Access to, use of, and outcomes from public health programs: the importance of building and maintaining trust with patients/clients. Front Public Health 2017;5:22. DOI: 10.3389/fpubh.2017.00022.

[30] Row R, Calnan M. Trust relations in health care – the new agenda. Eur J Public Health. 2006;16:4-6. DOI: 10.1093/eurpub/ckl004.

[31] Gilson T. Trust and the development of health care as a social institution. Soc Sci Med. 2003;56:1453-1468. DOI: 10.1016/S0277-9536(02)00142-9.

[32] Giddens A. The consequences of modernity. Polity Press, Cambridge, 1990.

[33] Evaristi H., Kouvo Antti, Venetoklis T. Social and institutional trust in times of crisis: Greece 2002 – 2011. Social Indicators Research. 2019;141: 1207-1123. DOI: 10.1007/s11205-018-1862-y.

[34] Browlie J, Howson A. "Leaps of faith" and MMR: an empirical study of trust. Sociology. 2005;39: 221-239. DOI: 10.1177/0038038505050536.

[35] American Academy of Arts and Science. *Public trust in vaccines: defining a research agenda.* Cambridge (MA). American Academy of Arts and Sciences, 2014. Published online : https://www.amacad.org/publication/public-trust-vaccines-defining-research-agenda [Accessed 20/4/2021].

[36] Lee J, Sniderman B, Marquad B, et al. Embedding trust into Covid-19 recovery. Four dimensions of stakeholder trust. Deloitte insights. Published online April 23, 2020: https://www2.deloitte.com/uk/en/insights/economy/covid-19/building-trust-during-covid-19-recovery.html [Accessed 20/4/2021].

[37] Barry JM. Pandemics: Avoiding the mistakes of 1918. Nature. 2009;459: 324-325. DOI: 10.1038/459324a.