Utilization of e-healthcard through a Mobile app technology in building Nation's Health especially in COVID-19 Pandemic preparedness.

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Abstract: *Any country to control pandemic it need to know about its population in regards to diseases , health-wise, births, deaths, age categorization, income and about the various kinds of diseases prevalent in the country both communicable and non-communicable. Through the use of ehealthcard mobile app technology a cross sectional, authenticated data of whole nation as well as all over globe can be produced in very short time and which can continually upgraded to know health trends in all people of nations and world compared to any sampled study. Also it can highly reduce the cost as well as time consuming of surveys and help build healthier nations and a healthy world. Knowing the health profile of each and every human existing in the world in a sustainable track manner is the start point from where the world agencies can do its best to promote global health and avoid health crisis.*

Keywords: *ehealthcard, mobile app, pandemic preparedness, health Methods : Google search engine, Pubmed, WHO articles*

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Objectives
- Creation of an authenticated and less time consuming method of data collection at national and global level.
- To help early notification of diseases and alert national and global agencies in a very short time and thereby help in pandemic preparedness.
- To increase efficiency of data collection in countries and reduce costs in health surveys.
- To improve data availability for research and planning

I.   Introduction

Data and facts are not like pebbles on a beach, waiting to be picked up and collected. They can only be perceived and measured through an underlying theoretical and conceptual framework, which defines relevant facts, and distinguishes them from background noise' Wolfson et al[1]. Today businesses and organizations are connected to their clients, customers, users, employees, vendors, and sometimes even their competitors. Data can tell a story about any of these relationships, and with this information, organizations can improve almost any aspect of their operations. Although data can be valuable, too much information is unwieldy, and the wrong data is useless. The right data collection method can mean the difference between useful insights and time-wasting misdirection.

Till today there are many countries trying to develop conceptual frameworks for monitoring, measuring, and managing the performance of their health systems to ensure effectiveness, equity, efficiency, and quality. Health systems can then only achieve and manage results aligned to established objectives and quality standards. Health information collection is an important part of any health system, but is often weak in low-income countries,

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clustered by poor quality data that are inadequate for informing health policy.[2-4]Due to unparalleled platforms of data collection it has lead to global investments in disease- and programme-specific monitoring and evaluation programmes by different agencies which have lead to a very large numbers of data collection methods, diverse indicator definitions and reporting frequencies, fragmented data collection, and uncoordinated efforts to strengthen national institutional capacity, resulting in an unnecessary reporting burden on countries and inefficiencies in strengthening country health information systems. [5] It seems that global agencies should bring greater alignment and efficiency to their investments by rationalizing existing reporting methods in order to reduce reporting requirements and ease the reporting burden on countries. [6]

Looking at the health and health care disparities it seems that it requires the full involvement of organizations that have an integral infrastructure for data collection and quality measurement and improvement.[7] Although hospitals, community health centers (CHCs), physician practices, private health policies, and local, state, and federal agencies can all play important roles by incorporating existing data collection and quality reporting efforts, all face challenges in attempting to achieve this objective.[8] Population-based surveys are an invaluable source of health information.[7,8] A key aim of these surveys is to provide high-quality data for policy development and programme planning, monitoring and evaluation.

In the COVID-19 scenario every country is suffering from the pandemic effects affecting each and every sector of the country including the economy. A country who is well prepared for the pandemic scenario can absorb the shock of pandemic and implement necessary measures to control it. For any country to control pandemic or any disease spread with even epidemic potential or endemicity it need to know its population first thoroughly in and out. It need to know about the population behavior in regards to diseases , health-wise, births, deaths, age wise categorization, income wise and now in today's era we feel the country should know about the various kinds of diseases prevalent in the country both communicable and non-communicable.

II. Problem statement

Throughout   history,   there   have   been   a   number   of   pandemics   of   diseases   such as smallpox and tuberculosis. [9 10] The most fatal pandemic recorded in human history was the Black Death (also known as The Plague), which killed an estimated 75–200 million people in the 14th century. [11][12][13] Other notable pandemics include the 1918 influenza pandemic (Spanish flu) and the 2009 influenza pandemic (H1N1). [14][15][16] Current pandemics include HIV/AIDS and the 2019–20 coronavirus pandemic. In the today's era of COVID-19 pandemic with involvement of almost 4 million people worldwide and almost 0.3 million deaths all over, the global health institutes are struggling for doing research on the novel Corona virus.

Apart from pandemics in developing nations like India it has been observed from previous studies that the health information system in India has not kept up with the epidemiological transition. [17] From previous studies it has been observed that India started conducting national health surveys from 1992 and was expected to provide more timely , helpful ,qualitative and quantitative data about the health of people and since then several rounds of the survey has collected a large amount of data. After analyzing National Family Health Survey (NFHS), the District Level Household Survey (DLHS) and the Annual Health Survey (AHS) it seemed that there is (i) inadequate coverage of noncommunicable diseases, injuries and some major communicable diseases; (ii) modest comparability between surveys on the key themes of child and maternal mortality and immunization to understand trends over time; (iii) short time intervals between the most recent survey rounds; and (iv) delays in making individual-level data available for analysis in the public domain. Rakhi et al [17] suggest that India plan for a single major national health survey at five-year intervals in consultation with key stakeholders. This could cover additional major causes of the disease burden and their risk factors, as well as causes of death and adult mortality rate estimation. So the existing survey procedures and methodology were highly criticized as incompetent, too expensive personnel wise and time consuming which further weakens the implementation processes.

The data collection is prominent as a priority to produce indicator in specific programme areas. [18] The database can be used by countries in the monitoring of national plans and programmes. [19] Many indicators and indicator definitions have been developed by international organizations, reference groups, interagency groups, countries, academics. The indicators are meant for programme management, allocation of resources, monitoring nation's progress, performance-based disbursement and global reporting. The development of indicator is dependent on the vastness and quality of data collection. [18,20]

Data sources: The main (preferred) data source or data collection methodology are specified like:
• civil registration and vital statistics systems;
• population-based health surveys;
• facility-generated data that include routine facility information systems and health facility assessments and surveys;
• administrative data sources such as financial and human resources information systems;
• indicators from other sources, including modeling

III. Importance and Uses of eHealthcard –

1. Guide monitoring of health results nationally and globally and provide a basis for the rationalization and alignment of reporting requirements on results by global partners.
2. Contribute to higher quality global data bases of health results by avoiding excessive and duplication of data reports.
3. Facilitate more harmonized investments in country data systems and analytical capacity.
4. Creation of a continuous upgraded form of database which can be upgraded everytime the patient gets hospitalized or any significant findings noted during health visits and thereby reflect evolving public health priorities and as such be updated and maintained in a sustainable way.
5. Notifying diseases – identification of notifiable diseases at practitioner or institutional level can be notified immediately to all levels of health authorities right upto global agencies in a very short time .
6. National health survey can be conducted through healthcard technology related to certain variables like history of communicable and noncommunicable diseases , its cross sectional prevalence, nutritional surveys, vital statistics, immunization survey. Also the healthcard can be bound to each and every person rather than sampled survey currently conducted in many nations.
7. Research and development - Basically there are two types of Research studies which are observational or non-interventional studies and interventional studies. For any interventional study to start with, a background literature is always required which usually come from previous observational studies. The main core part of observational studies is to collect data from the targeted population. In the era of COVID-19 pandemic its rather difficult to come in contact with any particular subject for taking data also its risky to collect data from population by roaming around physically. Also even if the pandemic resolves and things back to normal even then the efforts of practically moving around and choosing subjects and gathering data becomes a difficult task ,very much time bound process , a costly affair for recruiting volunteers for the purpose , transportation etc. An ehealthcard can help provide cross sectional data which can be sustainably kept upgraded and thereby help in Research studies.
8. Insurance companies Policies – like Mediclaims , Term insurances can be decided on the ehealthcard score and accordingly plan premiums ,benefits making the job easier and faster. Similarly Bank loans can verify the ehealthcard before handing over loans to individual persons after knowing their health status.
9. Social security- record of every person taking social security benefits can be kept in hand like the elderly, retired persons, handicapped etc.
10. Health programmes – ehealth card can provide data necessary for the planning of national programmes , allocating budgets , local as well as national and global level programmes can be planned according to the dtata collected.
11. Construction of life tables – the data collected can help calculate certain indicators like life expectancy, human development index, etc.

IV. Creation of eHealthcard database through Mobile app technology :

To streamline the activities of data collection we advise the use of mobile app having medical information records. A mobile app having features of recording

Figure no. 1 Methodology of creation of ehealthcard which can consume less time
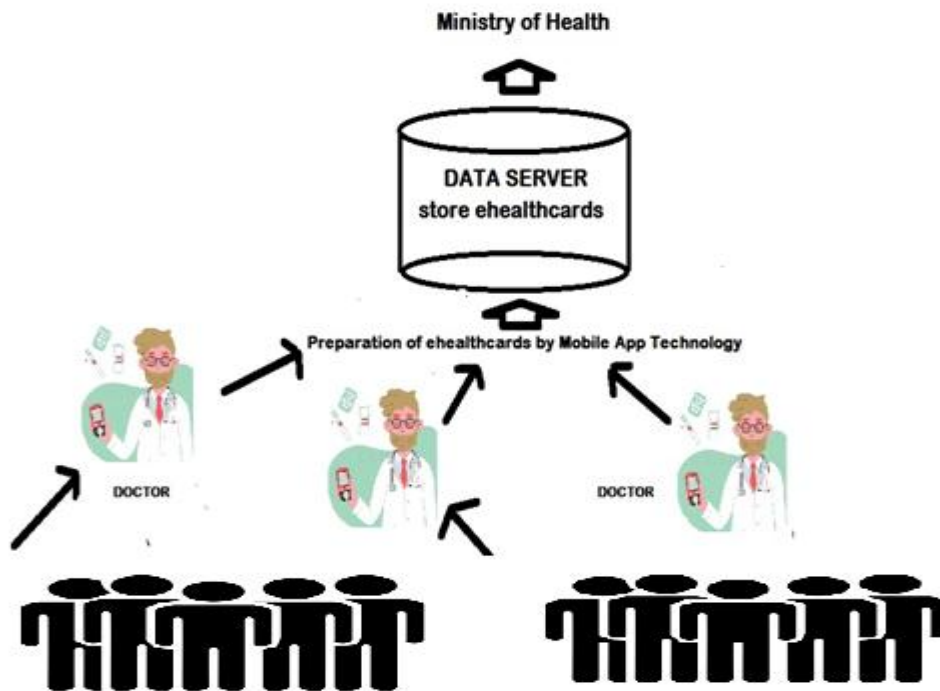
medical information of individuals can be used effectively. The medical mobile app questionnaire can be formulated nationwise as per required diseases more prevalent in the country. Preparing a national health registry by filling up the questionnaire of the health-related mobile app can help keeping ready in hand a medical data of the population which can be used in the period of pandemic. Linking the data with the unique identity number like aadhar card in India which can be kept confidential by the governing authorities and in times of pandemic situation or any disease related event at community level it can be used effectively to understand health behavior of the population while to plan control measures. Connecting with the UIDs of the particular nation or passport number can create a database which can be helpful to know the background history of all individuals of a community. Applying such a software globally can help nations to plan visa permit or deny to any particular individual so that cross infections across nations can be kept under vigil.The healthcard needs to get upgraded and should be done by a registered medical practitioner only to preserve the authenticity of the information. The information in mobile app need to be filled up by Registered Medical Practitioner (RMP) only. The data entered through the mobile app can be traced on certain softwares at the health authority offices through servers and stored. For this purpose they can require certain manpower to look-after the functioning of the systems. The data obtained through such kind of mobile app can get upgraded if the information filling is made mandatory for all hospitals , clinics by registered medical practitioner. By the involvement of certain esteemed political bodies or celebrities and high level Government officials people can be motivated for the filling of e healthcard, also should be mandatory for each and every individual who has a UID in a nation. As in todays era mobile phones are easily available with everyone and the usage of mobile app is comprehensive for anyone and for registered medical practitioners.

Figure no. 2 certain parameters to be included as case record form in mobile app

Case record form

Sr. no.	Parameter	Data
1.	Name	
2.	Age	
3.	Sex	
4.	Current Address	
5.	Aadhar no. (UID)	
6.	Phone no.	
7.	Religion	
8.	Caste	
9.	Known case of	
10.	Diagnosis	
11.	New presentation	
12.	Any significant finding	
13.	Diet history	
14.	Immunization history	
15.	Menstrual history	
16.	Psychiatric history	
17.	Skin disease history	
18.	Past History	
19.	Number of members in house	
20.	Total Income	
21.	H/o TB contact in family	
22.	Rooms in House	
23.	Cross ventilation present	
24.	Occupation	
25.	Addiction specify	
26.	On going drugs	
27.	H/o AKT	
28.	H/o Drug allergy	
29.	Travel history in last 3 months	
30.	Significant family history	
31.	height	
32.	weight	
33.	Significant general examination findings	
34.	Blood pressure	
35.	CVS	
36.	RS	
37.	CNS	
38.	P/A	
39.	Specific local Examination findings	
40.	Any significant treatment	
41.	Any other significant finding	
42.	Any significant lab records	
43.	Photograph of case	
44.	Photograph of any report xray., scans	

V. Discussion

Every nation conducts health survey of its population at regular intervals which is usually once in a decade or five yearly whose policies differ nationwise usually by selection of sample size from population to represent the whole population.[21] In the latent period no active healthwise measurements are taken due to the cost of survey studies making it nonfeasible to do in inbetween period of two surveys. Also no any country conducts in cross section for the whole population. Many times the survey are part of vertical programs and are bound with certain objectives only beyond which the data collection is non-feasible especially healthwise data as collecting such data requires particular training. Knowing the diseases existing in a population of a country can help the nation to plan necessary national control programs to have a hold of diseases and create a healthy population which can indirectly help to create a better manpower for a nation and reduce disease burden of the society and thereby improve the nations economy. Also in the scenario of pandemic like the COVID-19 when the disease is new very few data is available about the disease and immediate control measures becomes difficult as there is lack of background observational studies like the disease is prevalent in which group of patients age-wise, sex wise,

significantly associated with any other illness like diabetes , hypertension, ischemic heart disease , chronic kidney disease, asthma , skin diseases , strokes , immunocompromised states like HIV- AIDs, Tuberculosis or if certain population is not affected like the one vaccinated with certain vaccines like BCG, Polio, measles , MMR, etc. A certain level analysis becomes easier if such kind of data is already in hand and so accordingly the disease control measures can be taken at community or national level and there can be effective utilization of resources. Due to lack of background data the control measure to become effective a latent period takes place which consumes a number of deaths and morbidity in the population. Also it affects the economy indirectly and destroys the public morale of a safe living.

The database of all individuals health information can be used by the nation's health authority to calculate probability risk of getting infection by individuals who have predisposed conditions like the immunocompromised ones or outbreak of infections like Rubella , cytomegalo viruses should keep pregnant patients at alert. Similarly, the COVID-19 is seemed to be more common or have bad prognosis in the elderly, pregnant females while less common in children. The likelihood ratio of certain group of people with particular predisposing conditions can be known beforehand like patients on steroids or immunosuppressant drugs can have more likelihood of getting certain viral infections. Such number of patients can be known through the healthcard.

In developing countries like India fragmentation is a big problem come across by Health Information Systems in most states, and are typically amalgamated with historically institutionalised 'vertical' programs, as they collect their individual information independent of other programs, with little regard to supporting the overall information systems within the state. [22] As a result there is excessive data, with great overlaps of the same data collected many times, and sometimes leaving large lacunae in important areas with no data at all. That is also exaggerated by data and indicators being ill-standardised and represented in incompatible formats, making comparisons and analysis across program areas, difficult. [23] The purpose of integration of data through an accessible and comprehensive and user friendly channel is to enable a seamless flow of data from different sources available at 'one point' to give a more holistic overview of health system performance, to facilitate discussions of evidence-based planning and initiating the use of information for health programs.

It is observed that India's existing database through health workers remains inadequate, with information on those employed in public sector health facilities but no information on the large numbers in private practice. [24] In this context in 2016 WHO had published the first analysis report on state-level health workforce in India which is based on Census 2001 data. Having such a long 15-year lag, its policy relevance is highly limited, other than to function as a useful baseline. An immediate objective of the was to conduct a comprehensive study on the health workforce in India, analysing the latest Census data, to inform policies on health information. [24] Also, WHO advised India to standardise definitions, channelise collection of data, integrate existing data, and avoid duplication in order to bring out a comprehensive set of indicators every year which can track health and nutrition progress across the country at the sub-district level, across different attributes. [24] In the case of India, this systemic weakness has long been identified and acknowledged by the government. The National Health Policy of 2017 recognised the dire need for systematic and scientific population health statistics.[25] Initial assessments have identified several key issues such as lack of information on non-communicable diseases and injuries, dearth of primary data on causes of death, lack of private health sector numbers, and insufficient data at the district level.[26] India's health data remain limited, even though it had been a pioneer among developing countries in establishing data systems like the National Sample Surveys (NSS) started in 1950, and the Sample Registration System, in 1960.[27]In such a fragmented landscape, government ministries are often left with no choice but to depend on different and incompatible datasets. For example, key central ministries disagreed on whether India was on-track in achieving crucial targets of the Millennium Development Goals (MDG). A case in point is MDG 5, whose target was reduction of maternal mortality ratio (MMR) by three-quarters between 1990 and 2015. While the numbers published by the health ministry (MoHFW)[17] indicated that India can achieve this goal, the Ministry of Statistics (MoSPI) was less optimistic.[28] It turned out, however, that their respective estimations were based on two separate sets of numbers. To understand the huge regional, inter- and intra-state disparities better in order to solve them, large amounts of new information can be required. Indeed, a 'data revolution' is needed to make disaggregated data available if India wants to achieve—or get anywhere near—the ambitious SDG targets related to health.[29] Under-reporting of deaths of mothers and infants in the Health Management Information System (HMIS) is covered often in the media.[30] Acknowledging the weaknesses of HMIS studies have suggested rationalisation of registers and reports by discarding those with poor managerial value and amalgamating those with duplication, thus saving resources and easing staff burden. Apart from under-reporting of deaths and lack of coverage of private sector, the HMIS system does not provide information on the exposed population, thus making it impossible to calculate different indicators.

Planning is critical to mitigating the sudden and potentially catastrophic impact of an infectious disease pandemic on society, but it is far from straightforward [32] During a pandemic, decisions can be made under rapidly changing, uncertain conditions, with limited (if any) prior experience. [33]The Canadian framework has two main goals: to determine (1) the health of Canadians and (2) how well the health system performs and operates

according to the published principles of providing reports that respect Canadians' privacy and are also consistent, relevant, flexible, integrated, user-friendly and accessible. [34,35]

The data can be collected by the treating registered medical practitioner as an expert of medical field. A diagnosis or abstract of the patient required information can be entered as data. The entire record or abstracted digests of it should be used as a basis for evaluation. Also the practitioner can keep an assistant may be a nurse for filling the information by dictating her only as the question arises because summaries and abstracts can presumably be prepared by less skilled persons allowing the hard-to-get expert to concentrate on the actual task of evaluation. Abstracting, however, seemingly involves the exercise of judgment as to relevance and importance.[36] [37] . In some studies on data recording of physicians can be supported by recorded evidence additional to the physician's own entries like blood reports etc. [38]In general practice, patient records by physicians are adequate to serve as a basis for evaluation. The alternative is direct observation of the physician's activities by a well qualified colleague. [39] When standards are not very specific and the assessor must exercise his own judgment in arriving at an evaluation, very expert and careful judges must be used. [40] Lembcke et al claims a final diagnosis or summary of the patient by a practitioner can be considered valid for evaluation, it can be enteredin a special column where he feels a relevant significant history or suspected diagnosis is to be notified. [41] Research on information gathering includes studies of the perception and interpretation of physical signs. [42,43] Once the basic data is been accomplished it can be stored at populational sciences institute at state, national or global level and analyzed for monitoring evaluation. [44,45] Also it can be used as a secondary source of data for many purposes like planning programmes and policies at national and international levels and can also be used for research purposes.

VI. Limitations

1. The mobile app in English can be considered after assuming that every medical practitioner comprehens well with English and can fill up the required information.
2. Alongwith motivation of all people to get prepared a ehealthcard the registered medical practitioner also need to be motivated to fillup the information by taking out time from their busy schedules and update the ehealthcards.
3. Preparing the mobile app and connecting it to a software of the required specifications and servers to store the wholedata can incur some cost which the government need to bear but it can be for longterm help for government health bodies to plan their activities way ahead a pandemic occurs.
4. Persons not prepared their UID can have to get it prepared before enrolling for ehealthcard.
5. Information filling up by normal individuals or patients directly can be unauthenticated as some people may misuse it to divert the health department and may give rise to false alerts so after filling up the data need to get signed up by registered medical practitioner for it to get authenticated.
6. Filling the information may be time consuming for some practitioners and hence it need not be upgraded for OPD patients but IPD patients should be manadatory for hospitals as a person getting hospitalized has some significant illness which need to be upgraded in the card. Also at OPD level if any new significant finding is perceived like new diagnosis of hypertension or diabetes only then it has to be upgraded.
7. The RMPs need to undergo some sort of training to acknowledge the notifiable diseases and even certain out of box extra findings which is clinically significant and the RMP feels need to be notified can be enrolled in a column in the form of abstract or small digest which can be qualitatively analysed. The RMPs can be trained by Webinars or through and help column in the app itself or by distributing manuals or through websites.
8. Mutual understanding is necessary at global level if data sharing for VISA permits is to be considered through health profiles of individuals. Countries may be reluctant to share their citizens data with other countries but it is necessary to avoid further pandemic like situation occurrence.
9. Some developed countries like the UK , US, Australia already have a database operated electronically but it is limited to the institutional level and not of each and every individual staying in there country.

VII.   Recommendations

1. Mobile app can be prepared in English as most of only the registered medical practitioner can use it to fillup informations of the patients.
2. Registered medical practitioner who are enrolling people data into the mobile app can be motivated by giving certain credit points from medical councils or can be provided with incentives. Also they should be allowed to keep assistants to fill up information and they may dictate the fillings.
3. Compulsion of ehealthcard at all hospitals that is government and private can motivate people to get registered with UID also.
4. Once a database for one individual is created with detailed information at one point of time , the next time not all information need to be upgraded only new significant findings can be uploaded like diagnosis only for OPD

patients and for hospitalized patients certain important relevant information which the treating physician or surgeon feels important can be uploaded in any form like an abstract.

5. Database can be shared with research institutes who are doing ongoing researches at institutional level which can help to enhance its usage for right purpose and reduce cost of research and also it can sensitise more people to get into research fields and thereby boost technology.

6. Global agencies like the UN and WHO need to get involved for mutual understanding amongst countries to share the ehealthcard data for VISA permits and know the health profiles of travellers.

VIII. Conclusion

While a range of health and health care entities collect data, the data do not flow among these entities in a cohesive or standardized way. Methodologically rigorous, large-scale, regularly conducted surveys providing sound data on health are vitally important because they create an opportunity for the empowerment of people in decision-making and advocacy, assist agencies to identify priorities for strategies, policies and programmes, allow researchers to monitor change over time and evaluate studies and provide a platform to better understand the drivers of inequality. Ultimately, such data enables better responses to the health disparities among people that persist within countries and across regions. While existing surveys do provide a valuable resource, there is still a need to better harmonise our data production efforts to avoid duplication and reduce survey fatigue amongst stakeholders. Through the use of ehealthcard technology a cross sectional, authenticated data of whole nation as well as all over globe can be produced in a very short time and which can get continually upgraded to know the health trends in all people of nations and world compared to any sampled study. Also it can highly reduce the cost as well as time consuming of surveys and help build healthier nations and a healthy world. Knowing the health profie of each and every human existing in the world in a sustainable trackable manner is the start point from where the world agencies can do its best to promote global health and avoid health crisis.

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