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Initiation and Maintenance of Diseases and Diagnostics Database for Bangladeshi Individuals

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ABSTRACT

The pharmaceutical sector of Bangladesh is uprising day by day and the quality of drugs is touching an expected level, thereby is recognized by US FDA (United States Food and Drug Administration) and UK's MHRA (United Kingdom's Medicines and Health products Regulatory Agency). However, the health sector of Bangladesh has not yet well developed due to antibiotic resistance, adverse drug reactions and improper management of drugs. On the contrary, Bangladesh is developing enormously in the information and communication technology sectors. So, it is very much possible to introduce a network based health care system by which the health sector of Bangladesh can be improved. Information and communication technology can be used to overcome those healthcare drawbacks by maintaining a proposed Diseases and Diagnostics Database system (DDD). Thus, we conducted a survey based on the necessity of DDD among Health professionals (MBBS doctors, Students, Intern doctors, Emergency medical officers), Pharmaceutical company executives and Faculties of Pharmacy, University of Dhaka. According to our survey, 100% agree with the poor condition of our health sector and the emergency of DDD. So, proper initiation and maintenance of DDD may be a strong weapon to develop health sectors relating to patients compliance and pharmaceutical development which will foster the economy of our country.

Keywords: Diseases and diagnostics database (DDD), adverse drug reactions (ADR), antibiotic resistance and information & communication.

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INTRODUCTION

Health is the most important among all the basic needs of human. It's always told that a healthy nation is the biggest source of any country. But it is very much difficult to implement the proper health system if the literacy rate is not so high and the technological system is not well developed. Bangladesh has great opportunities to cope up these problems in terms of technology as the sector is developing in a lightning speed. Although the literacy rate is quite low, the problems can be overcome if it is possible to make the sectors more user-friendly and totally handled by a set of qualified health professionals. So, a suitable system can be modified in order to improve the current situation. Initiating and maintaining the Disease and Diagnostics Database (DDD) may be a way to develop not only the health sector of our country but also to enrich our pharmaceutical sectors as well as our market shares and economy.

DDD is a fully electronic based system which has a certain chance to help our health sector in various ways to reach to the zenith of success.[1,2] In past and now also, telemedicine is the main source of transferring and exchanging the medical data. It's not easy to handle all the medical data at a time and again it's not possible to go to the physician personally every time for treatment. Medical science needs all the documents of a patient in order to provide a correct and rational treatment. Having examined all the data, the suitable treatment is given to the patient which is the actual procedure. However, in most cases, the medicines are prescribed based on empirical way and proper treatment might not be possible. As a result, rational use of drug is being hampered, resistances of drugs are becoming prominent, and as well the mortality rate is being increased day by day. In case of information and communication technology (ICT) based health care system, it is very much possible to open a new era in the health sector which will be more effective for the patients.[3] Developed countries like Germany, Sweden, Denmark as well as developing countries like India and Kenya have endorsed this system in order to enrich their health sector by decreasing the mortality rate and increasing rational treatment.y.[4-9] Other developed countries like France, Australia, and Netherlands are trying to adopt this type of system.[10-12] In those countries, personal digital assistant (PDA) based health care system had been introduced where in a smart card, all the information of the patients are stored and during treatment, this smart card is placed into the PDA device to find out the patients history and data via the database server that is prerequisite for implementing DDD.[13] In case of emergency, it is very much possible to make the system more use-friendly and finger print may be used to access the system. Multiple systems may be used based on the severity of the needs.

Bangladesh badly needs this system for the urban and rural people in order to establish a safe health care system. If web based health care system is introduced, then it is very much possible to increase the rational use of drug as well as the medical practice. Patients can get rid of the chronic diseases monitoring and vaccination system which is a hard need for them. So, the purpose of our study was to introduce better, safe and cost effective health care system; to manage and rational use of drugs and reduce its misuse/abuse; to reduce patient's burden; to develop connectivity of pharmaceutical sectors with the heath service provider in order to enrich the economy of the country and ultimately to introduce an e-health system.

MATERIALS AND METHOD

As this system is directly related with the health of the people, so it was very sophisticated to choose a suitable method. Because of its relation with the mass people, a survey was very much needed. Again extensive literature review was performed in order to get the proper information and knowledge as it's a very new concept in our country. The respondents were selected in that manner because they have a clear idea about this relevant topic. The health professionals can give idea about the disease pattern and also propose a system that may be useful. The pharmaceutical company executives are the basic source that can give idea about the drugs management system throughout the country and also about the current trends of drugs. The pharmacy teachers or faculties are the potential sources of giving ideas about the modification of the systems as they have better idea about the patient compliance and related topics. We have selected two medical colleges - Dhaka Medical College and Hospital (DMCH), Shaheed Shuharawardi Medical College and Hospital (SSMCH), one pharmaceutical company- Incepta Pharmaceuticals Limited and the respective teachers of Department of Pharmacy, University of Dhaka.

Data sources:

Both the primary and secondary data were collected in order to perform the project. The primary and main respondents for this project were the doctors, internship doctors of two medical college hospitals, teachers of Pharmacy Faculty and the employees of Pharmaceutical companies in Bangladesh. Various reports, research journals, newspapers, related books, articles and online sources were the main sources of secondary information.

Data collection:

Primary field investigation was performed to get the proper and correct information which may be suitable for the system. Respondent's perceptions and suggestions were taken from the

selected medical colleges in Bangladesh to fulfill specific purpose of the research within the particular time. A sample survey was conducted in different medical colleges among the 30 respondents who were doctors and internship doctors, teachers and the employees of the pharmaceutical company. Simple random sampling procedure was used for the project. Primary data was collected using the interviews of the respondents from selected medical colleges, department of pharmacy, pharmaceutical company. The methods of data collection were survey and questionnaire.

RESULTS AND DISCUSSION

Demographic characteristics of the respondents:

The result of our survey showed that, 86.67% of the respondent was male and 13.33% of the respondent was female (see table 1). Again, 76.67% of them are health professionals (MBBS doctors, MBBS students, EMO, Intern students), 10% of them are teachers of Department of Pharmacy and remaining 13.33% are the executive of pharmaceutical company.

Table 1: Demographic characteristics of the respondents

Parameters	Frequency	Percent (%)
Sex		
Male	26	86.67
Female	4	13.33
Total	30	100
Health Professionals		
MBBS Doctors, MBBS students, EMO, Intern Doctors	23	76.67
Pharmacy Teachers	3	10
Pharmaceutical Company Executive	4	13.33
Total	30	100

Necessity of the DDD system for Bangladeshi individuals:

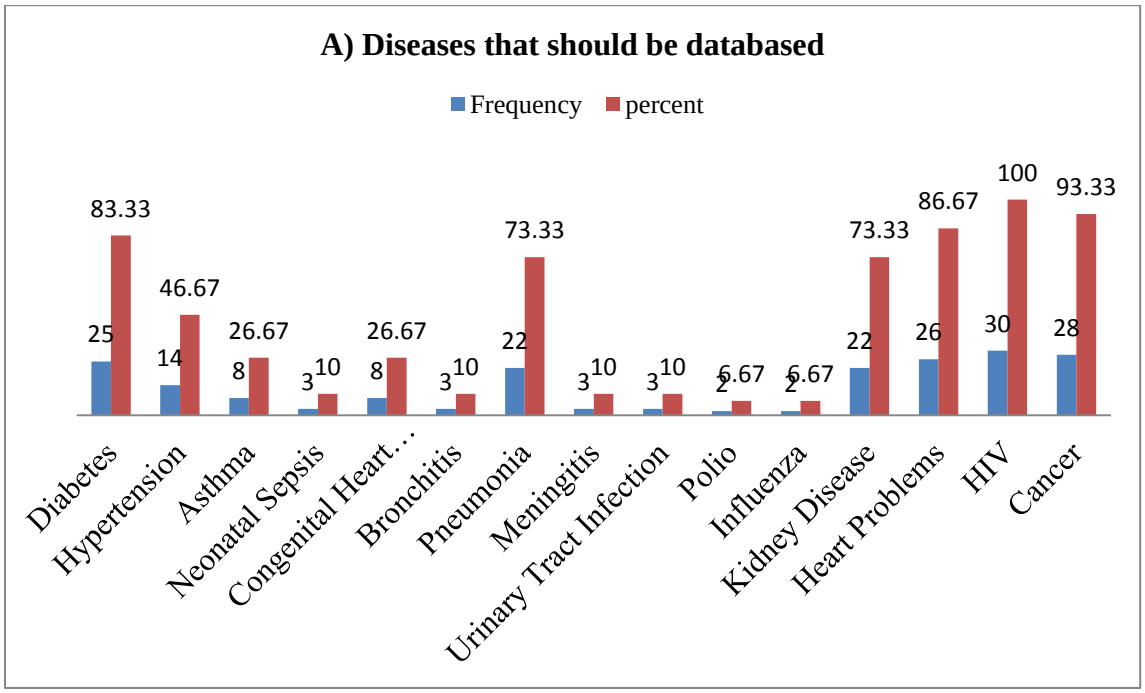
Our survey result showed that the necessity of the DDD based health care system for Bangladeshi individuals is very much needed. As the health care system is not well developed and as well not well structured, that's why 100% people responded positively.

Diseases that should be data based according to proposed system:

According to our survey for the disease database, 83.33% responded for diabetes, 46.67% for hypertension, 26.67% for asthma, 10% for neonatal sepsis, 26.67% for congenital heart disease, 10% for bronchitis, 73.33% for pneumonia, 10% for meningitis, 10% for urinary tract infection, 6.67% for polio, 6.67% for influenza, 75.33% for kidney disease, 86.67% for heart problems, 100% for HIV and 93.33% for cancer (Figure 1A).

Diagnostic approaches that should be performed according to the proposed system:

After surveying over the respondents it was observed that 100% respondents approached positively for blood test, while 80% and 63.3% for bacterial culture test and specific disease tests (ticked in provided questionnaire number 2) respectively. No response was found in case of other tests (Figure 1B).



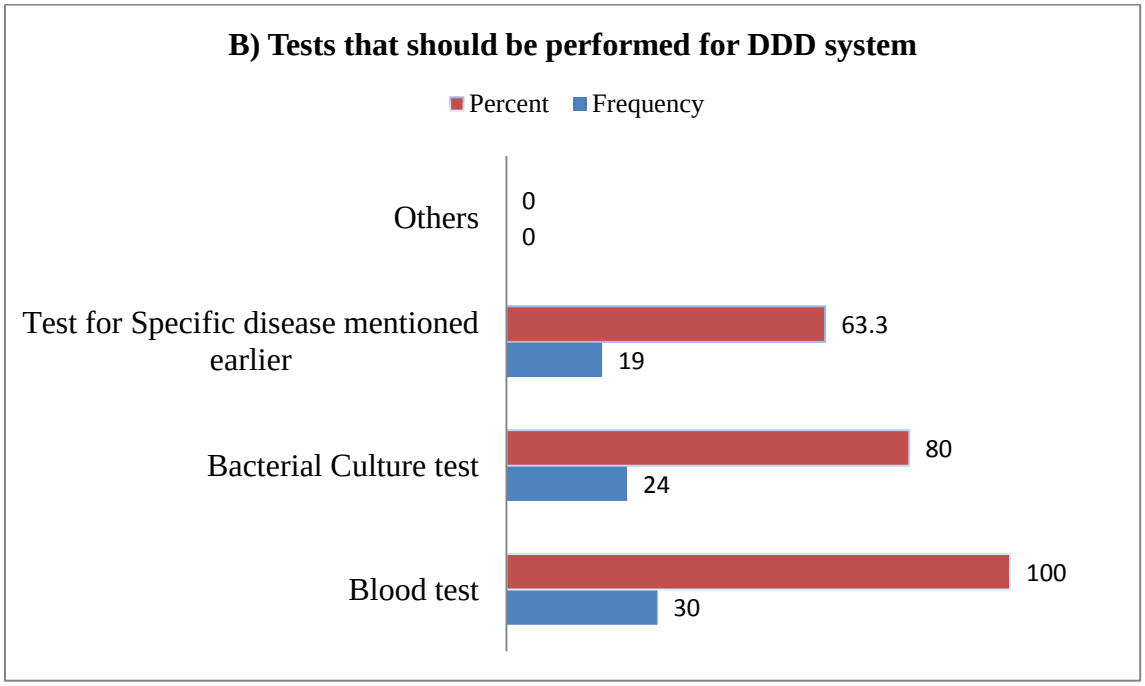


Figure 1: Diseases and diagnostic tests that should be data based according to proposed health care system: A) Diseases and B) Diagnostics tests respectively.

Starting time and interval period for the proposed DDD healthcare system for individuals:

As per our survey result, 93.34% respondents expressed that the DDD system should start during birth and 3.33% respondents mentioned that it should start at the age of 10years and remaining 3.33% respondents showed interest after the 18years. However, 83.34% respondents commented that it should be validated after every 5 years interval.

The authority for conducting and maintaining the proposed database:

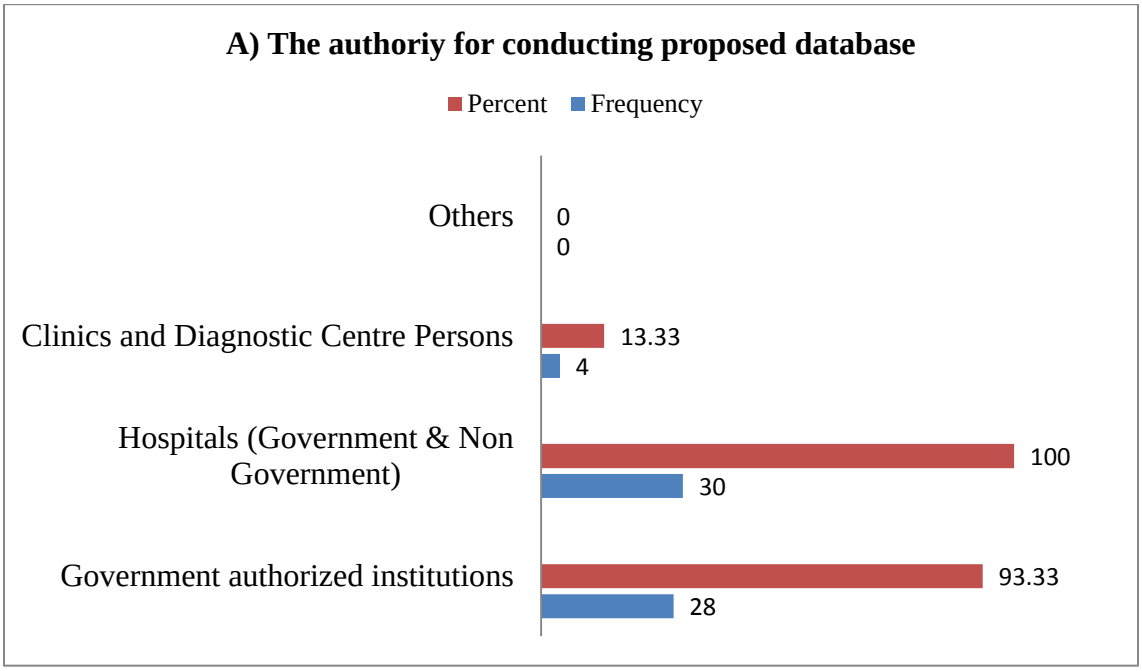
For the conductance of the proposed database, some authority should handle it. According to our survey result, 93.33% respondents clearly opined that the Government of Bangladesh should conduct the database as a proper authority. On the other hand 100% respondents gave their opinion for Hospitals (Government and Non Government) and 13.33% for Clinics and Diagnostic Centre. Others systems were not proposed. However, 73.34% respondents opined in maintaining the system by a central database operation (Figure 2A).

Role of patients in the maintenance of the proposed DDD system:

According to 80% of the total respondents' opinion, the patient should step forward for the maintenance of the proposed DDD heath care system with a smart e-health card that will have unique DDD code number, while the rest of the 20% respondents showed interest for birth certificate. No responses were found for using the National ID card in case of the proposed DDD healthcare system.

Control of access of the proposed healthcare system:

From our survey, it was observed that the accessing of the proposed healthcare should be nested to the Doctors by 100 % respondents. However, 56.67% responded that this system should be accessed by the government authorized persons, and 40% responded that pharmacists should have also access to this healthcare system for dispensing rational drug (Figure 2B).



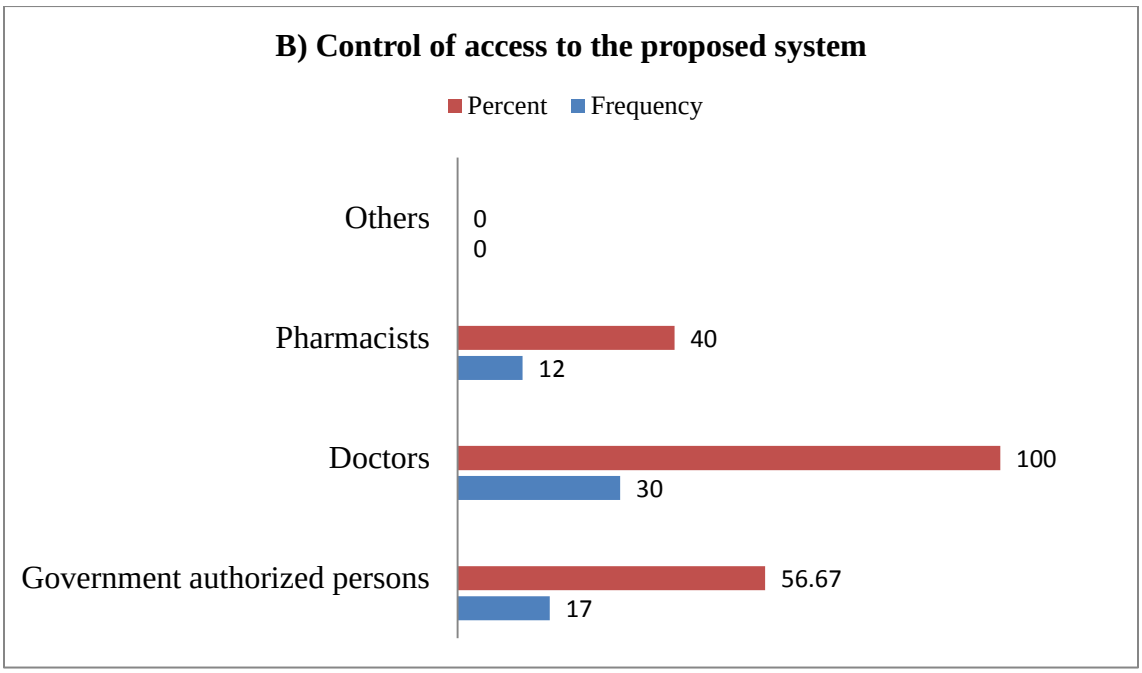


Figure 2: The authority and the access for conducting the proposed health care system: A) Authority and B) Control of access respectively.

Improvement of our health sector by managing the proposed system:

We have also conducted survey in order to understand the peoples' perception on the improvement of our health sector by managing the proposed healthcare system. According to our survey result, 100% respondents gave their opinions that this proposed healthcare system will reduce the mortality rate, increase the health consciousness among people and finally will

improve our health sectors. They also opined that it will also reduce the abuse of drugs and ultimately will increase the rational use of drugs and patient compliance.

Correlation of the proposed system with e-prescription and online drug delivery:

From our survey, 100% respondents had opinions that this system can be correlated with e-prescription and online drug delivery systems. By this way, the dispensing of drug can be monitored rationally.

Information sharing of diagnostic centers, hospitals and clinics in the proposed database system:

Besides hospitals, there are many diagnostic centers and clinics in Bangladesh, so the respective diagnostic centers and the clinics should share their different diagnostic tests information of the patients for the better maintenance of the proposed system. According to our survey result, 100% respondents expressed the similar opinions that diagnostic centers, hospitals and clinics should share the information in the database system.

Problems during implementing the proposed system:

Our survey result showed that 73.33% believed that network problem may hinder the proposed system during implementation. 86.67% had opinions that illiteracy may be a big problem; however 96.67% gave their opinions on lack of expert personnel (Figure 3) with less knowledge.

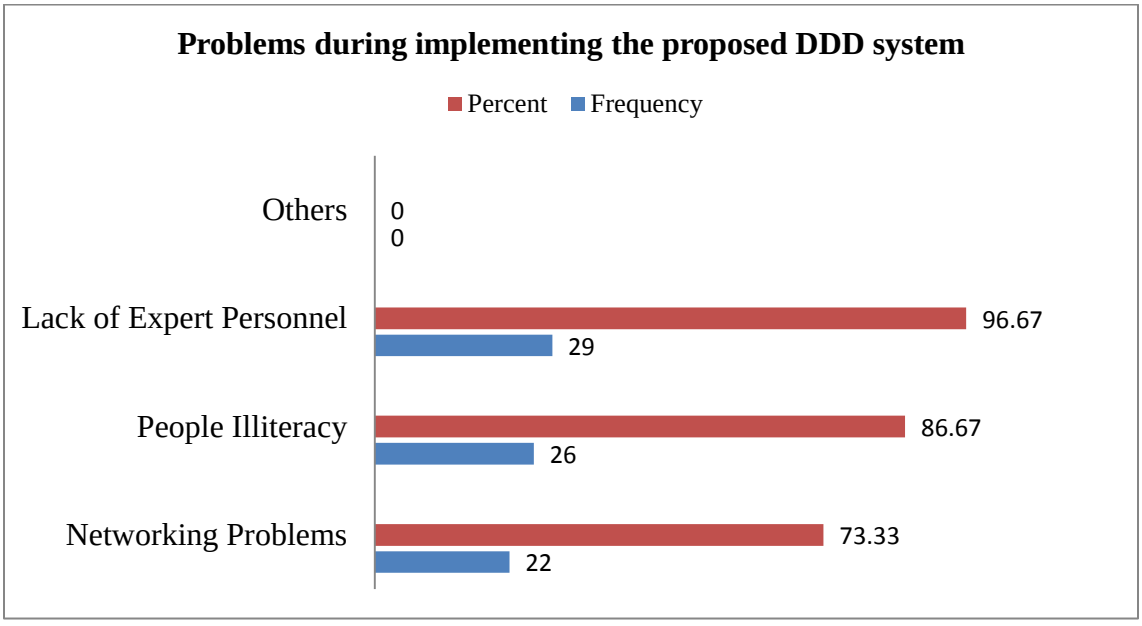


Figure 3: Problems during implementing the proposed system

As 76% of the total populations of Bangladesh live in the rural areas[14] and it is assumed that they are far away from modern health care facilities and system, so, the respondents think that this proposed DDD system is very much necessary for the people for getting proper health care

services. If the proposed DDD is maintained for individual person by a central authority, then it will not only beneficiary for the people, but also help the rural doctor to be interested in remote area, ultimately it will reduce the burden of the patient. The proposed database management system (Figure 4) will also allow the doctor to maintain and update a drug/disease/diagnostic database profile for Bangladeshi individual. Thus, it will help the physicians to select the right drug for the right patient at the right time; ultimately the long desired rational use of drug will be prevailed. In case of diseases, now-a-days HIV, cancer, cardiovascular diseases, kidney disease, and pneumonia got the prevalence and these types of diseases are increasing day by day and drawing attention vitally. These diseases are more life threatening and people are of course suffering by this diseases. In case of diagnostic tests, the respondents expressed their opinion that blood tests should be given preference so that blood related disorders can be easily diagnosed. Besides, people can easily donate and receive the blood in case of emergency. Bacterial culture tests will also help to choose the correct antibiotics and reduce the irrational use of antibiotics. So, the drug selection can also be appropriate if we can manage the proposed health system. This system should be started during birth for better efficacy while some had different opinion on the starting time, however, everybody agrees upon the similar phenomena about the starting of the proposed system. Validation or updating can be done once s/he visits doctor or diagnostic centers or hospitals, however, there should be a specific time interval to maintain the database. In that case, two years or five years time interval may be allowed. According to our opinion, the system should be started from the birth of a child, and it should be validated with ages (definitely with a specified time interval) in order to get the better healthcare. DDD health card with unique number may be a good solution to maintain the system, because it will be very specific for individual. National Identity Card can be used and data can be used altogether but it may cause errors. In case of access system, the Government authorized institutions as well as the government and non government hospital should be given preference to do it, as it will be the main source of patient's admission. Government authorization institute will maintain and observe the systems as well as perform to solve the untoward effects. Government and Non government hospitals are the source where the patients are admitted. So they should have the right to maintain the system. Doctors and Pharmacists should access the system as the doctors have clear idea about the disease pattern and the pharmacists have vast knowledge about the drugs. DDD system can be maintained by centrally so that all the data are available in the central database and it can be easily distributed. This DDD system can easily increase the patients' compliance; reduce the misuse of drugs as all the data will be available in a

card. Again the system can be correlated with the e-prescription and online drug delivery system as the data are in a card and the drug seller can easily deliver the drugs by checking out the card or by taking the number of the card.

The survey data showed that various life threatening diseases are now very much common and we have not yet developed such database system. So, sometimes it becomes very difficult to provide them right treatment. If the data are stored in the specific database of the personnel then,

- Personalized drug can be prescribed by seeing the gene sequences.
- Antibiotic resistance can be prevented by the bacterial culture test.
- Blood test is a life time issue and in case of donating or taking blood, the Rh and others factors may be checked out.
- Proper management can be done by checking out previous data.
- Telemedicine are fully guess based as they don't have the data of the patient in case of Bangladesh atmosphere. So they can check out the patient condition through the number and can give a better solution.
- Adverse drug reactions (ADR) can be prevented.
- Online drug delivery system can be modified.

On the other hand, rural people can easily check their data from the urban or specialized physicians from abroad by giving the DDD number. The physician can check out the history and tests and can prescribe a data. It is very much possible to align with the abroad modern hospital with this system to transfer the technology and knowledge. Pharmaceutical company as well as Government will get the data of total patients as well as the number of patients in specific diseases which will help to develop new drugs or current drugs. Proper drug management system can be done by observing this data. It will also help to further growth of our economy by manufacturing and exporting the respective medicines.

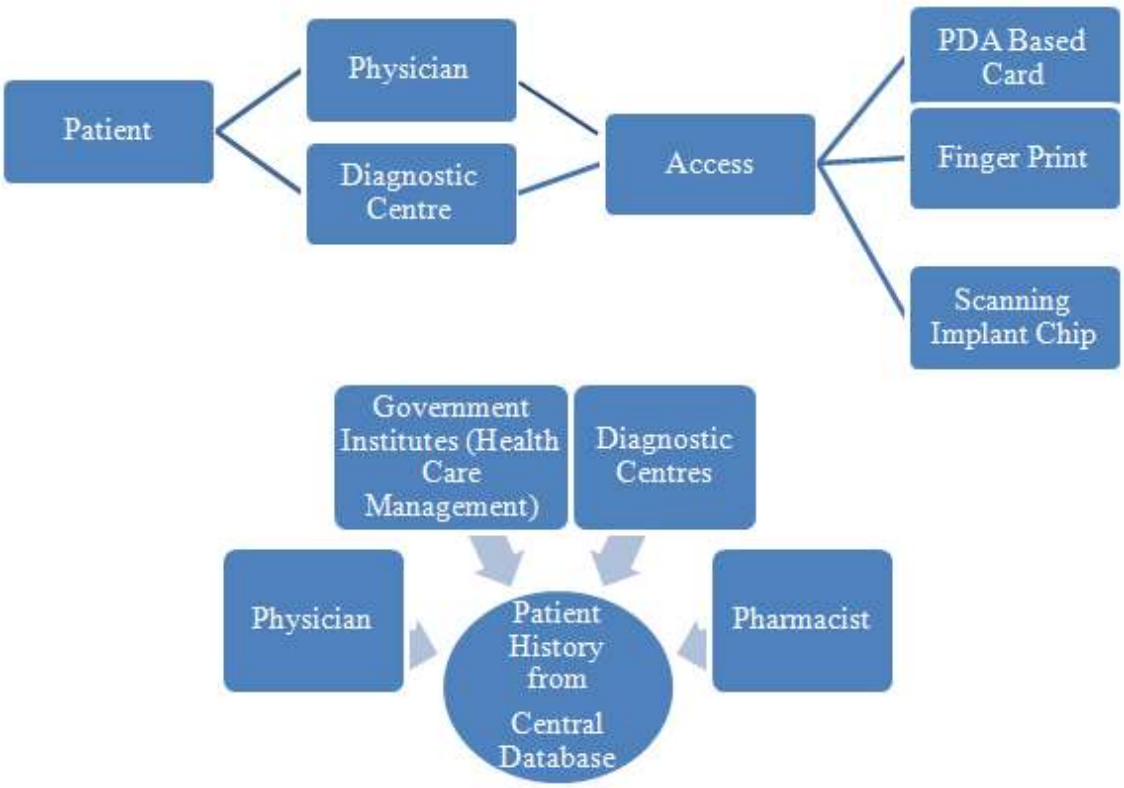


Figure 4 : Management and accesing system of proposed disease and diagnostics database (DDD)

Lack of expert personnel, improper management of drugs, and lack of knowledge are the main drawbacks to implement the new concept for the Bangladeshi people. Networking problems is another major problem as internet system is not fully available in all the region of Bangladesh. Our government should take initiatives to train up respective professionals to be skilled in their respective area, as well to develop our infrastructure to smooth the mobility of networking so that the problems can be overcome and we can implement the proposed heath system to optimize the healthcare facilities.

CONCLUSION

A convenient system like Diseases and Diagnostics Database (DDD) may be a precursor to solve the problems of our health sector by reducing mortality rate, misuse of drugs and also by enriching the proper management of drugs as well as development of pharmaceutical sectors. Online drug delivery system can be introduced by applying DDD. Training is required for the doctors and nurses to make the system come true. The institutions may conduct further researches from the data of the proposed data base and newer protective system may be come out. This system may be authorized fully by Government with a group of experts so that a new era in the health sectors can be opened. All the physicians should be under this system and the

privacy as well as the security should be maintained hardly. Future works can be done by modifying the software system. The software will be developed as like that it will correlate the data and will give a list of safe drugs according to the diseases. Contra indicatory drugs will be omitted automatically and the drugs that will suit the patient will show in the screen. It will be easier than to take the proper decision in a quick time and in a safe way. It will be safer and less time consuming as well as money saving system for the Bangladeshi Individuals.

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