

Screening and Comprehensive Care for Cardiovascular Diseases and Diabetes, at Primary Health Care Setting in Iraq

1. INTRODUCTION

1.1 Overview:

Noncommunicable diseases represent a major public health problem all over the world. It constitutes the first cause of morbidity and premature mortality in Iraq. The four major diseases (cardiovascular diseases, Cancers, diabetes and chronic respiratory diseases) constitute 50% of total mortality. Cardiovascular diseases contribute to one third of total mortality. Regarding death contributory risk factors, global studies estimated that raised blood pressure is ranked the first followed by tobacco use, raised blood glucose then physical inactivity and overweight and obesity. As any other country in the region, there is an epidemiological transition in Iraq with increasing prevalence of contributory risk factors.

Hypertension and diabetes are considered the two major contributors, whether individually or by interacting collectively, to the occurrence of the main chronic non-communicable diseases mainly cardiovascular diseases, cerebrovascular diseases, renal disease, and retinopathy. They may also indicate the presence of other behavioural risk factors such as physical inactivity or unhealthy diet.

According to the STEPS survey on NCD risk factors conducted in Iraq in 2015 among adult population 18+ years the prevalence of high blood pressure is (35.6%), hyperglycemia (13.9%) and hypercholesterolemia (39.6%). It has been estimated that 12% are at high risk of cardiovascular attack.

It is well known globally that about one third of people with hypertension are unaware of their condition. Even modest elevation in blood pressure is associated with an increase in the prevalence of Heart and Cerebro-vascular diseases.

Similarly, diabetes is frequently not diagnosed until complications appear, and approximately one third of all people with diabetes may be undiagnosed. Chronic hyperglycemia is associated with long-term dysfunction, damage, and failure of various organs, especially the eyes, kidneys, nerves, heart, and blood vessels.

Therefore, hypertension and diabetes can be considered the top candidates for early detection and management as part of prevention and control of cardiovascular diseases.

Cardiovascular risk assessment is an important intervention to prevent premature mortality attributed to these diseases. It is considered one of the "Best Buy" interventions by the WHO. It constitutes an estimation of the total risk of developing CVD over the following 10 years based on risk factors parameters of the individuals. Predicting the risk of an individual could be helpful in making clinical decisions for interventions.

The identified individuals at high risk should be targeted through health systems using integrated management approach with preventive medication and lifestyle modification to prevent fatal and non-fatal cardiovascular events.

High premature mortality attributed to cardiovascular diseases added to the considerable proportion of pre-hypertension and impaired fasting plasma glucose among Iraqi population necessitate integration of Cardiovascular Risk Prediction to the established Screening and Comprehensive Care for Hypertension and Diabetes and in Iraq at PHC level. For this reason, cardiovascular risk prediction has been introduced into the existing screening system mentioned earlier.

1.2 Rationale:

Cardiovascular diseases and diabetes represent the leading cause of morbidity and mortality in Iraq and there is high prevalence of cardiovascular risk factors among adult population mainly high blood pressure and high blood glucose. A considerable proportion of those are not aware of their conditions.

Both hypertension and diabetes meet the essential criteria indicated for screening including:

- Both diseases represent important health problems that impose significant disease burden on adult population.
- The natural history of the diseases is well understood.
- There is a recognizable preclinical (asymptomatic) stage during which these conditions can be diagnosed.
- Tests are available that can detect the undiagnosed conditions in the preclinical stage.

Moreover, there is a clear clinical evidence that lowering blood pressure is beneficial to population and that the incidence of several leading causes of premature death among adult population can be reduced through early detection and management of high blood pressure.

Although there is no documented evidence about the cost-effectiveness of screening project in reducing morbidity and mortality attributed to diabetes, it is very well known that treating cases diagnosed early in clinical practice would result in clinically important improvement in the outcome of the disease. These clinical findings rather necessitates establishing a screening system to address cases of type 2 diabetes due to the presence of the preclinical state. Screening is not recommended for type 1 diabetes because of the acute onset of symptoms.

It is also recommended that normotensive adults should measure their blood pressure at least once every two years. Also, individuals should be screened for diabetes every 3 years. The rationale for this interval is that the test will be repeated before substantial time elapses, therefore it is less likely that an individual with a false negative result to develop any of the complications to a significant degree within this period.

Persons with abnormal readings require more frequent measurements. The frequency of checkups should be based on the status of the individual.

In order to ensure the effectiveness of screening, the following areas were taken into consideration:

- Availability of Health Facilities and other resources needed to treat newly detected cases

- Screening should be a systematic ongoing process, and not merely a single one time effort.
- The cost of case finding and treatment is balanced against health expenditures as a whole.

Cardiovascular risk assessment is critical to prioritize the implementation of the management plan. Timely and sustained essential intervention for people with high cardiovascular risk through lifestyle modification and drug therapy can prevent the occurrence of the vast majority of fatal or non-fatal cardiovascular events.

1.3 Goal and Objectives:

Goal:

Prevention of morbidity and prematurity attributed to non communicable diseases through screening of hypertension and diabetes and cardiovascular risk prediction.

Objectives:

1. Identify the undiagnosed asymptomatic conditions of hypertension and diabetes among adult attendees to Primary Health Care centers in Iraq.
2. Determine the 10-Year Risk of Cardiovascular Diseases among adult attendees to Primary Health Care centers in Iraq.
3. Reinforce integrated health care for noncommunicable diseases at primary health care level in accordance with the national indicators.
4. Strengthen the noncommunicable diseases surveillance system.

Outcome Indicators:

- percentage of PHCs that apply screening and comprehensive care for CVD and diabetes
- Percentage of eligible people receive drug therapy and counselling to prevent heart attack and stroke

2. MATERIALS AND METHODS

2.1 Ethical Approval:

- Official approval has been obtained from the Ministry of Health for implementation and expansion of the project.
- The Directorates of Health agreed to follow the national action plan for NCD prevention and control.
- The eligible PHC attendants are informed about the objectives of the project and the importance of their participation.

2.2 Setting:

The effectiveness of screening projects depends on the health setting where it is performed. Based on the supposition that a screening system outside a health care facility may not be as effective as inside health setting, and assuming that the patient's first health care contact with the existing health system starts at Primary Health Care PHC level, it was recommended that PHC level must be the appropriate level for screening; therefore, PHC attendees should be screened to ensure that people with a positive screening test could obtain appropriate diagnostic testing, follow-up and care; in addition to proper utilization of available resources.

2.3 Screened population frame:

Selection of PHC centers:

The screening system has been established since 2008 in 5% of the main PHC centers in Iraq. Based on the ministerial plan to expand the project as an integral part of the health system developmental plan, a stepwise expansion began since 2009 on an annual basis to reach all of the main PHCs by the end of 2012.

Individual selection criteria:

Adults whose age is 20 years and above who attending the PHC centers and were not previously diagnosed are considered eligible for screening according to the following selection criteria

- Adults 20 years and above were screened for hypertension
- Adults 40 years and above were screened for diabetes

2.4 Screening testing:

Screening tests are only applied to asymptomatic persons, who are unaware of their clinical condition and identify those individuals who are likely to have the disease. Those with positive screening tests need to pass through diagnostic tests to establish a definitive diagnosis.

Screening methods and cut off points

Screening method for High blood pressure:

- A standardized sphygmomanometer is used for screening. A set of standard instructions for BP measurement are followed in measurement.

High blood pressure (HBP) is defined as systolic pressure of 140 mm Hg or more and /or diastolic pressure of 90 mmHg or more where the result of examination is recorded as screening test positive (+ve).

Screening method for Hyperglycemia:

- 1- Casual plasma glucose measurements is used in the first visit as mostly attendees are not fasting: is defined as a test performed any time of the day regardless the time since the last meal. A plasma glucose of 200mg/dl (11.1mmol/l) is considered hyperglycemia and the screening test is recorded as (+ve).
- 2- Fasting plasma glucose (FPG) is used to confirm diagnosis in the second visit.

Confirmation of diagnosis of Hypertension and Diabetes:

Diagnosis of hypertension or diabetes should not be based on one single measurement; Diagnosis is only confirmed after more than one elevated readings at separate visits. Therefore, an individual with positive screening results for high blood pressure or for hyperglycemia is given an appointment on a different day to be retested to confirm the diagnosis.

Based on the WHO/ISH recommendations, as well as JNC7 guidelines, hypertension is defined as a systolic blood pressure of 140 mm Hg or more and /or diastolic pressure of 90 mmHg or more on an average of two or more readings taken at each of two or more visits after initial screening.

The diagnosis of diabetes among the screened +ve is confirmed when FPG reads ≥ 126 mg/dl (7.0 mmol/l) on the next visit. Still, if the diagnostic test result shows FPG < 126 mg/dl (< 7.0 mmol/l) and there is a high suspicion for diabetes, an OGTT should be recommended.

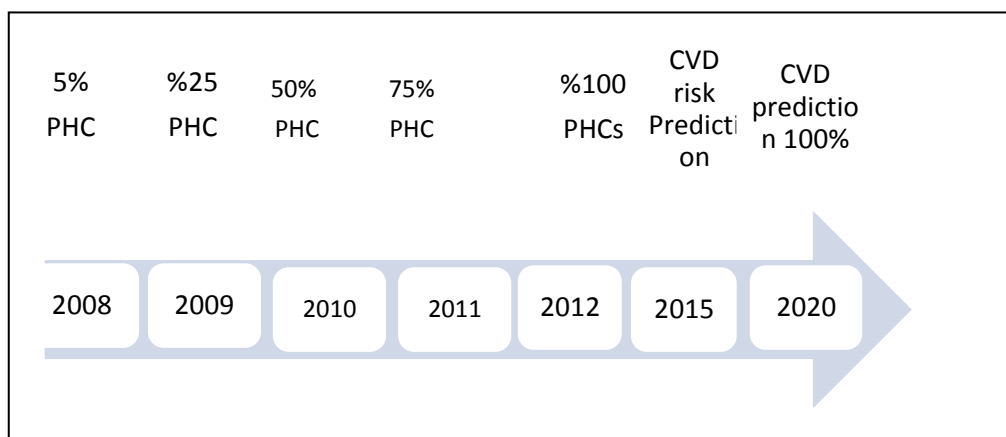
Drug History of glucocorticoids and nicotinic acid and other diabetogenic drugs intake should also be taken into consideration when performing the test.

2.5 Cardiovascular risk assessment:

An estimate of the total risk of developing major cardiovascular event (myocardial infarction and stroke) over the following 10 years is used to identify high-risk people for primary prevention. The WHO/ISH (EMR D) risk predication charts without blood cholesterol testing was used.

Those people with moderate-to-high receive counseling for physical activity, diet therapy and tobacco quitting in addition to drug therapy based on the national guidelines. tobacco quitting

The project of cardiovascular risk prediction was introduced as an integral part of the existing screening system for hypertension and diabetes in one PHC center per sector in each Directorate of Health during 2015/2016. The project will expand in a stepwise approach to include all of the main PHCs by the year 2020.



Action plan for Cardiovascular Risk Prediction:

outcome	indicators	Actions	executors	2015	2016	2017	2018	2019	2020
Competent NCD managers at DoH on CVD risk prediction	Percentage of trained NCD managers	Central Training of trainers for DoH NCD managers	MoH NCD dep						
Strengthened PHC capacity on care provision	Percentage of trained PHC workforce at selected PHCs	Local training of PHC workforce	DoH NCD Sections	100%					
	Percentage of equipped PHCs	Provision supplies for PHCs	DoH NCD Sections	100%					
Provision of care	Percentage of PHCs implementing	Monitorin and supervision			5%	25%	50%	75%	100%

2.6 Personnel:

Supervisors:

General central supervision by the MOH is carried out by the key senior staff members of the non-communicable department and other related departments of the Directorate of public health at MOH in addition to representatives from other concerned directorates at the MOH mainly the Directorate of Technical Affairs.

At the level of Directorates of Health, local supervision is carried out by the NCD sections in addition to an assigned team of laboratory supervisors from the reference laboratory and programmers/ IT . In addition to sharing the supervision process, the Head of the public health department and the directors of PHC sectors at District level carry out the responsibility of provision of supplies and equipments.

Supervisory reports are produced on regular basis and submitted to the Director General of the Directorate of Health at governorates. At central level, the information is analyzed by the surveillance section at NCD department at the Directorate of Public Health and a follow-up report is submitted to the policy makers and feedback is made to the Directorates of Health.

Central and local supervision has helped in analyzing the current situation of services and in the need assessment process at the directorates of health at governorate level. The Directors General of the DoHs, their deputies and other key administrative staff were personally engaged in the problem solving process carried out at the local levels based on the delegation of authorities provided to them by MoH at central level represented by the Directorate of Public Health, Directorate of Technical affairs, Directorate of Planning and Human Resources Development, Administrative, Legal and Financial Directorate and the State Company for Marketing Drugs and Medical Appliances (KIMADIA). Ministerial approval is obtained for further allocation of resources, and solving problems if they are beyond the ceiling of local authorities.

PHC screening team:

Physicians:

A mal-distribution of physicians was noticed among the PHCs within the same DOH for several social reasons. Some DOHs still have scarce human resources mainly due to the limited local staff and the high turn over of the non-resident staff members.

The scope of their role is limited to confirmation of the diagnosis, risk assessment , provision of primary care and referral of the cases when indicated, in addition to follow-up of the detected cases and those previously diagnosed. The task of screening is shifted to the paramedical staff.

The screening staff:

It is recommended to have at least two members in each PHC center nominated to carry out the screening process, record the results of the two visits, organize the registration and follow up of the participants in the screening project and the diagnosed cases..in addition to the joint work with the rest of the staff to produce the reports.

Reception staff:

The PHC reception staff is trained to identify the eligible PHC attendants, and to refer the enrolled attendants to the screening staff.

Laboratory staff:

Screening and diagnostic tests are carried out as part of the general lab work.

Data entry staff:

In each PHC center, one data entry personnel is identified and trained. In collaboration with the registry staff, the registered data is computerized on regular basis, and monthly statistical reports are sent to the NCD unit at the governorate Directorate of Health then to the central NCD section and the Computed Information Section at the Directorate of Public Health at the MoH.

Hospital staff:

A number of Cardiologists, Endocrine and Diabetes Specialists and Ophthalmologists have participated in training the PHC physicians and the process of referral and feedback to the PHC centers.

Also, a biochemist is assigned from each reference lab to monitor the function of the PHC laboratories of the DOH, participate in need assessment and facilitate solving emerging problems in collaboration with the NCD managers and other related departments.

Data management personnel:

A programmer from the DOH is trained to monitor data entry process at the PHCs in the directorate and follow up the updates in the program with the Surveillance Section at NCD department at the Directorate of Public Health at the MoH.

2.7 Supplies and equipment:

All of the supplies and equipment of the screening are provided by the Directorates of Health DOHs based on their local needs. Either provided by the MoH/KIMADIA or directly procured by the DOHs in the governorates.

2.8 Materials prepared for the PHCs:

Work materials are annually reviewed and updated jointly on the central meetings with NCD managers at the DoHs. Then they are published at the DoH and distributed to the PHCs:

- Screening form.
- ISH cardiovascular prediction charts
- Follow up card.
- Screening registry.
- Patient record form.
- Referral form.
- Guidelines and manual.

Also, the published national guidelines are distributed to the PHC physicians

2.9 Formulating a computerized data entry tool for the screening system:

The screening data entry tool is formulated utilizing EXCELL by the Surveillance section at the NCD Department/ Directorate of Public Health/ MOH to be used by the data entry personnel at the PHC centers and supervised by the programmers at the directorates of health to produce local reports. Further analysis is applied at central level.

2.10 Complementary Comprehensive care requirements:

Several issues were required to accomplish the provision of proper care for the diagnosed cases in collaboration with other levels of care. Therefore, the followings were considered:

- **Establishment of recording system:**

In order to establish a solid recording system at PHC level, a comprehensive case record form has been developed, piloted, and annually updated. It is used and filled in for the previously diagnosed cases among the PHC attendees, and for those confirmed through the screening project.

This record form has been prepared to enhance the involvement and support paramedical staff in the care process through filling the first page of the record which is written in native language; Arabic; concerning general information, information on risk factors, anthropometric measurement and recently, blood pressure measurement. The part filled by the physician is in English language and is designed to provide effective guidance in cases assessment and to save time in filling.

In order to incorporate this intervention into the existing national health system, the record has been used as an integral part of the patient record form at those PHC centers which adopt family medicine approach. It has also been introduced to the electronic Health Information System HIS at the PHC centers.

- **Enhancement of referral system:**

The diagnosed cases are referred to hospitals at secondary health care level where consultation is required for further investigations or management. The same hospitals are selected for training of the PHC physicians so as to build up a collaborative and interactive relationship between different levels of care, that would contribute to enhancement of feedback of the referred cases to the PHCs.

- **Introduction of treatment of hypertension and diabetes at PHC centers.**

As part of the Ministry of Health approach towards strengthening PHC services, Most of the essential drugs are for the treatment of hypertension and diabetes and prevention of cardiovascular diseases are introduced into the list of essential drugs of the PHC centers.

Monitoring of implementation:

Supervisory visits:

Direct supervision and coaching is carried out by central supervisors from the NCD department at MoH and the local NCD sections to the concerned staff at the selected PHC centers. Appraisal of the work is made according to a set of criteria.

The function of the PHC laboratories are monitored by the assigned Biochemist from the reference lab at each DOH..

Data entry is monitored by the trained programmer at the DOH in collaboration with the central program supervisors.

Follow up meeting:

Several one day meetings are carried out for appraisal of the work team at the PHCs by the NCD focal points in each governorate to discuss the results of implementation, the strength and weakness points and the recommended appropriate solutions.

2.11 Evaluation

Central evaluation reports are produced on annual basis by the NCD department at the Directorate of Public Health of the MoH according to specified indicators on the local plan of action.

3. RESULTS

3.1 Progress in implementation of the screening system:

The coverage with screening reached 100% of the main PHC centers all over Iraq by 2012. However, a variation in the reporting template in Kurdistan DoHs was witnessed, hence, could not be merged into the main data line to be analyzed.

Due to the economic crisis in 2014 and the serious security situation that interfered with implementation, a considerable decline was encountered in reporting in these governorates.

By the year 2016 with the process of renovation and rehabilitation reporting started in two of the affected governorates in addition to improvement in registration in others.

3.2 Screening Results 2016

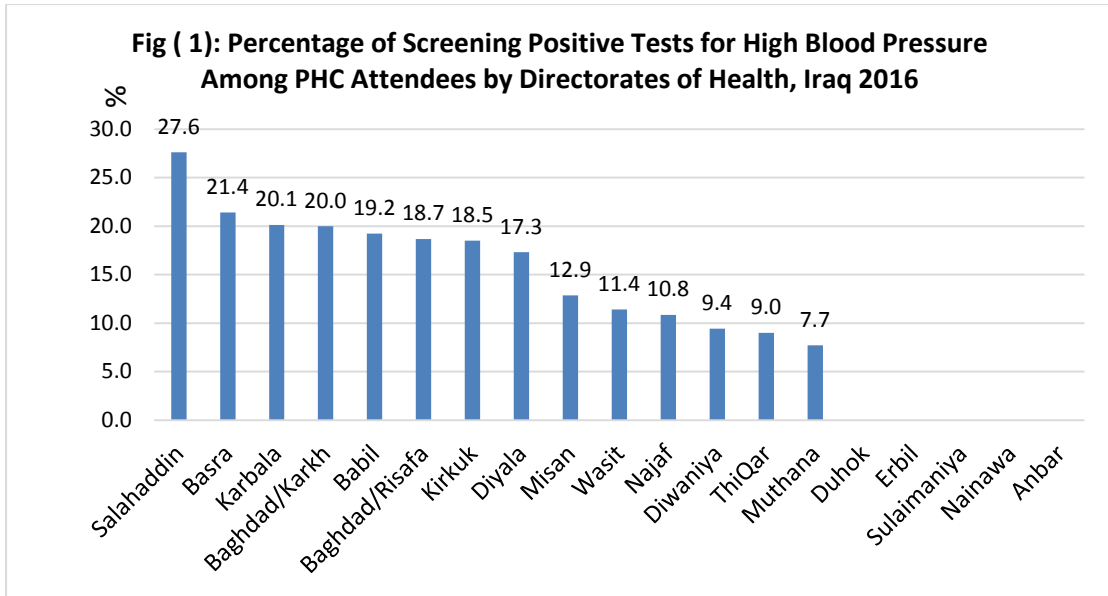
3.2.1 Participation:

The DOHs screening registries showed that more than 850,000 PHC attendants were screened during 2016.

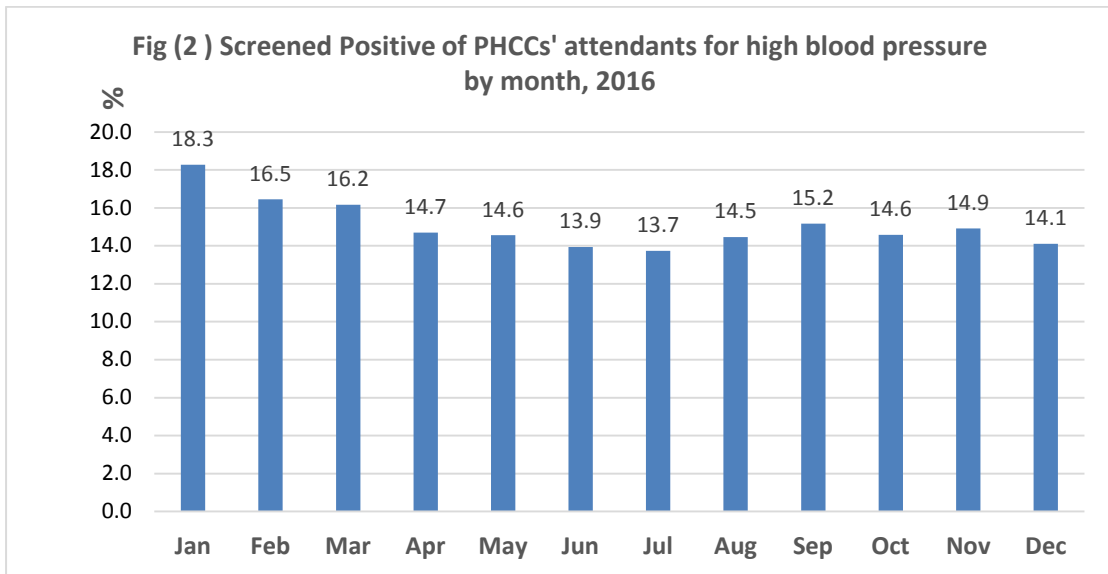
3.2.2 Screening results:

A total of 793611 screening tests for hypertension were carried out for the PHC attendants aged 20 years and more, and 258009 screening tests for diabetes were done for 40 years and more

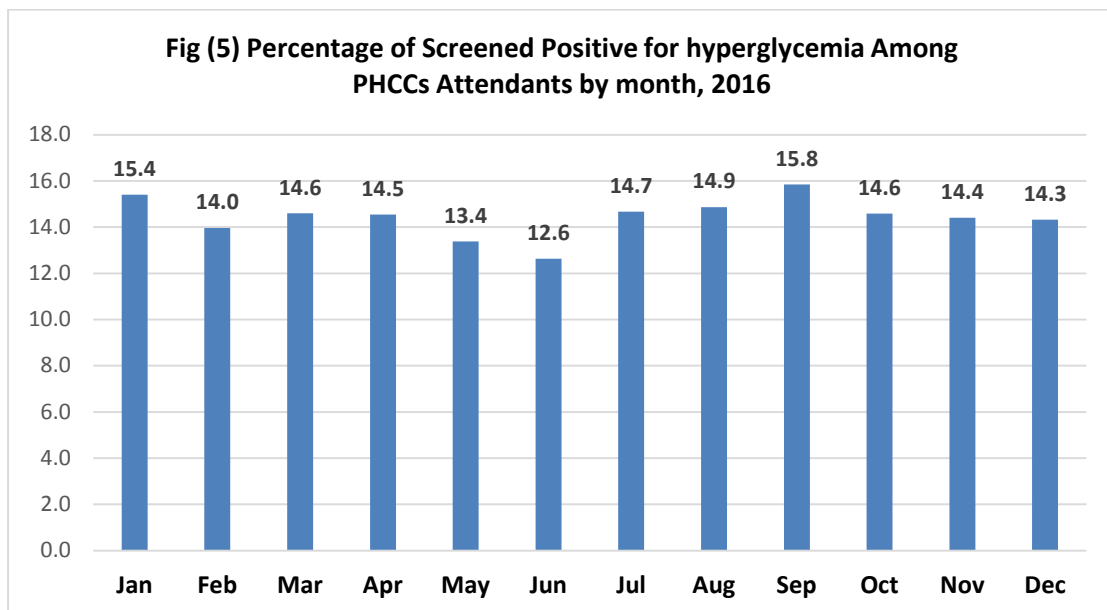
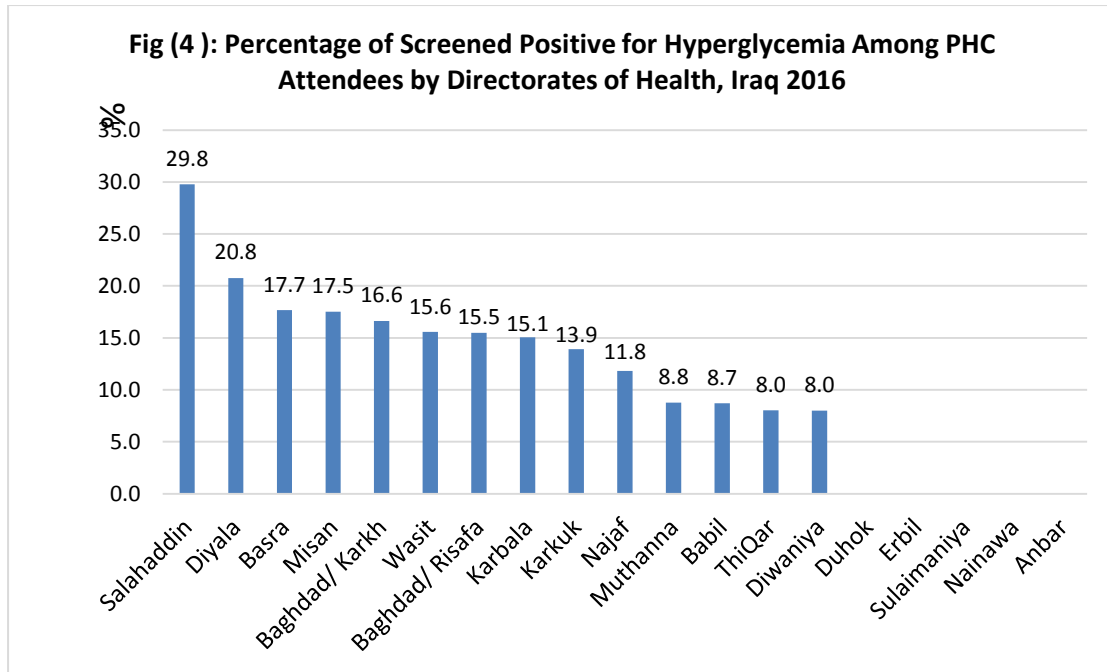
According to the screening 14% of those 20 years and more had high blood pressure. However, reporting varied among DoHs (fig 1).



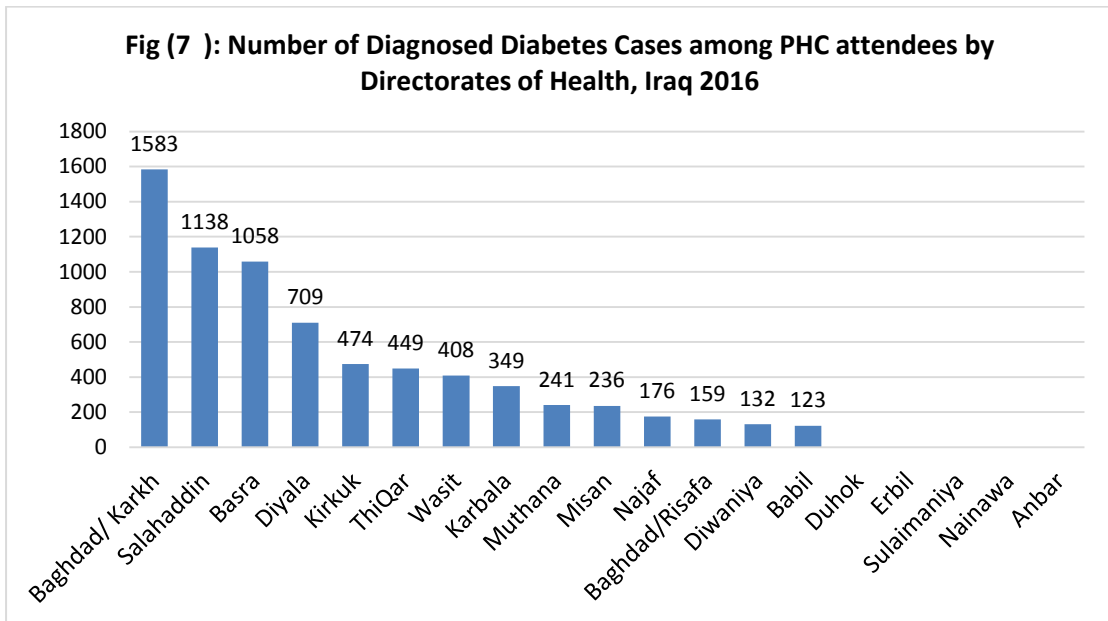
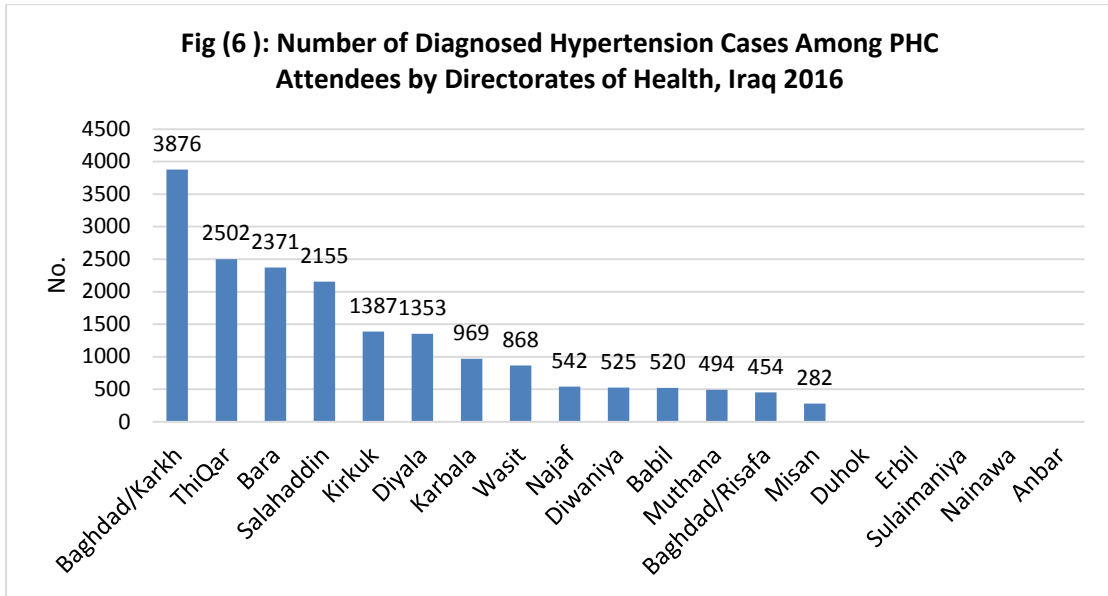
Detection rates were higher during the first quarter of the year (fig2).



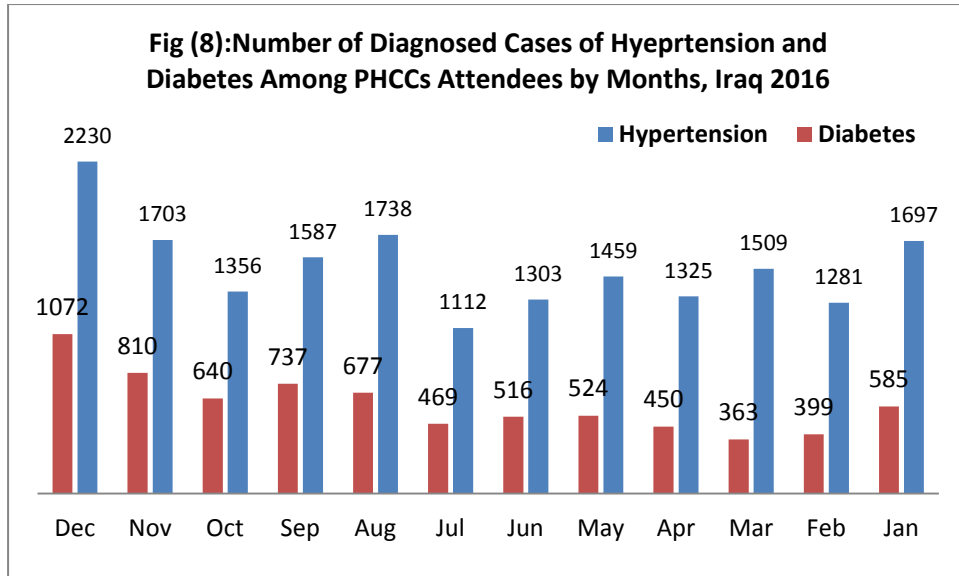
As for hyperglycemia, it was detected among 13.6 % of the PHC attendees aged 40 years and more (fig 4). Monthly reporting was nearly similar to that of high blood pressure (fig 5).



Accordingly, a total of 18300 hypertension cases were diagnosed, more than one fifth of the cases were reported from Baghdad Al Karkh (fig 6). Also, 7242 cases of diabetes cases were diagnosed mainly in Baghdad (fig 7)



The obvious variation in recording the diagnosed cases among DOHs indicates the decline in the second confirmatory visits in those with low frequency. This was reflected on the monthly reporting of the cases (fig8).



Cardiovascular risk prediction:

During 2016 the project of cardiovascular risk prediction was implemented in 7.6% of main PHCCs. More than 7000 attendees were screened.

According to WHO-ISH risk assessment Results showed that around 5% of the attendees 40 years and more were at high risk of developing cardiovascular event within 10 years .

Out of those with high cardiovascular risk and those already diagnosed % received drug therapy and % had counseling (fig 9 , 10).

Fig (9): Percentage of PHC Attendees with High Cardiovascular Risk (≥ 30) Who Received Drug Therapy at Selected PHCCs, Iraq 2016

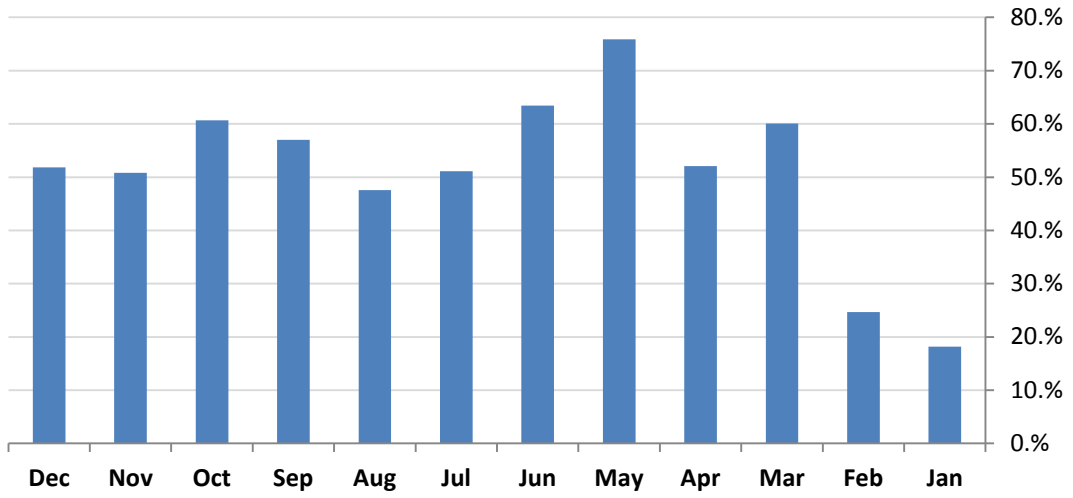
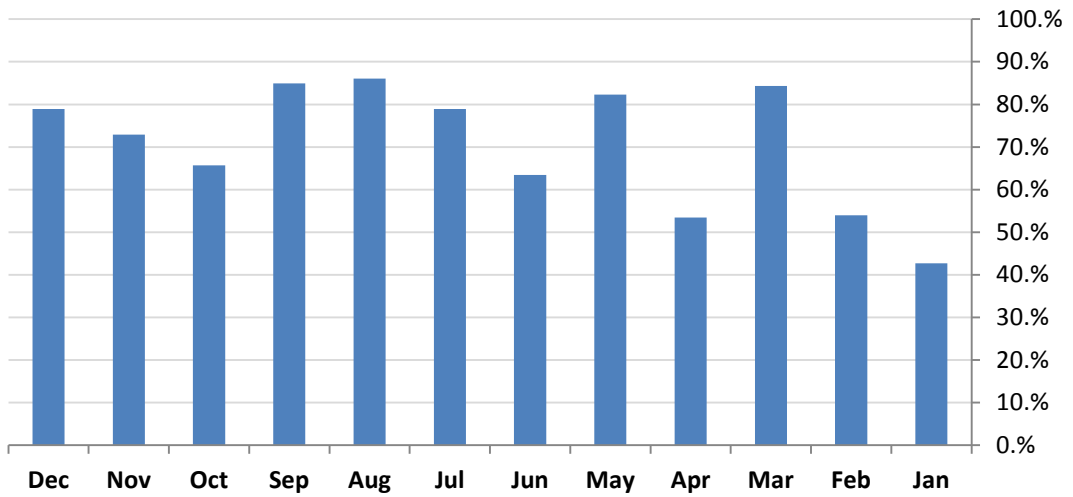


Fig (10): Percentage of PHC Attendees with High Cardiovascular Risk (≥ 30) Who Received Counseling at Selected PHCCs, Iraq 2016



4. CONCLUSIONS:

- The screening system has been included as an integral part of the PHC service package.
- It is evident that more than 16% of the PHC attendant adults of 20 years and older have high blood pressure and around % of the attendants of 40 years and older have hyperglycemia.
- More than cases of hypertension and/or diabetes are detected yearly since the beginning of the project that require comprehensive multi-disciplinary care and competent referral/ feedback system.
- Around % of conditions with high cardiovascular risk were predicted that necessitates of provision of preventive therapy and counseling.
- The screening is sustained by the financial support of the of the MoH at central and DoH levels.

5. RECOMMENDATIONS:

- Strengthening human capacity through introduction into the continuous professional development curriculum.
- Upgrading the electronic recording system.
- Earmarking budget for sustainability of the screening system requirements.
- Strengthening the comprehensive multi-disciplinary and multilevel services for the diagnosed cases..
- Introduction of this system within the indicators for evaluation of the quality of the primary NCD care services in Iraq.