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KNOWLEDGE OF PRIMARY HEALTH CARE DOCTORS ABOUT SCHEDULE AND TIMING OF SCREENING PROGRAMS DONE IN IRAQ: SAMPLE FROM BAGHDAD.

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ABSTRACT

Background: Screening aims to identify people in the healthy population who are at higher risk of a health problem or a condition so that an early treatment or intervention can be offered, thereby reducing the incidence and mortality of the health problem or condition within the population. **Objective:** To assess the knowledge of Primary health care doctors about the timing and schedule of screening programs done in Iraq. **Methods:** A cross-sectional study with analytic elements carried out in 30 primary healthcare centers in Baghdad, Iraq, chosen by simple random sampling during the period from 2nd Jan to 30th June 2022, using a self-structured paper questionnaire was employed to assess the Knowledge of primary healthcare doctors about the timing and schedule of screening programs done in Iraq. The inclusion criteria were all doctors who work at chosen PHCC and are present at the time of the researcher's visit and are accepted to be involved in this study. The exclusion criteria were doctors who are not found during the researcher's visit day and doctors who will be included in the pilot study. There were 155 physician answered the questionnaire, the collected data were analyzed by using SPSS v.26; frequency, percentage and Chi-square test were calculated. Findings with a P value less than 0.05 were considered significant. **Results:** There were 155 primary healthcare doctors enrolled in this study, aged between 30-39 (43.1%), most of them are females 78.1%, married 75.5%, and 29.7% were board students with years of experience less than or equal to five years 28.4%, 60.6% of the participating doctors did not take any training courses about screening programs. 83.2% of them had fair overall knowledge, 10.3% of them had good total screening knowledge, and 6.5% had poor knowledge. **Conclusion:** The study found that the majority of the participants had fair total knowledge about the timing of screening. Better knowledge was accomplished by the age group of 30 - 39 years old and most of them are specialists with years of experience of 6 -10 years, doctors' gender and marital status did not illustrate the statistically significant influence on the level of knowledge.

CHAPTER ONE: INTRODUCTION

INTRODUCTION

Screening has a good purpose by identifying people in the healthy population who are at higher risk of a health problem or a condition so that an early treatment or intervention can be offered, thereby reducing the incidence and mortality of the health problem or condition within the population.[1] Screening tests do not diagnose the illness, peoples who test positive typically require further evaluation with subsequent diagnostic tests or procedures.[2] The aim of screening is to improve individual health through an early detection of diseases at a stage where the prognosis of disease could be significantly. However, screening intervention is costly and it's necessary concern criteria in selection of targeted diseases and screening tests.[3]

An effective screening program can deliver significant public health benefits such as a reduction in the incidence and mortality of the disease, early and noninvasive intervention, that detecting the condition at an early stage provides using a less-toxic treatment or intervention in addition to individuals, the family and society benefits. Also, economic analysis has shown screening can save society life support costs into adulthood by preventing long-term disabilities, such as during antenatal and postnatal screenings.[1]

Medical screening became possible when at least four conditions were met:

- The availability of simple, valid, & acceptable forms of tests.
- The discovery of effective treatments.
- The establishment of a theory of screening.

- Broad access to health care.

Historically, screening for psychiatric disorders in the United States Army was one of the oldest screening programs in 1917. In 1951 the United States Commission of Chronic Illness defined screening as "the presumptive identification of not recognized disease or defect by applying tests, examinations, or other procedures that can be used rapidly". Medical screening has existed for more than 60 years and has a vibrant history and the preclinical identification of disease has been a significant component of modern medicine and public health.[4]

In most countries, national health services offer cancer screening programs for breast, colon, and cervical cancer. These secondary prevention measures are considered an integral part of treatment in oncology. During the COVID-19 pandemic, screenings have been suspended and severely reduced worldwide during the first and second waves due to the reprioritization of health services.[5]

Iraqi Health General Administration activities expanded after establishing the World Health Organization (WHO) in 1947 as that period witnessed advances in curative and preventive medicine. In November 1952, the Iraqi Ministry Of Health (MOH) was re-establishing as an independent ministry. During that time, the MOH consisted of two main directorates; the directorate of preventive medicine and general medical services.[6]

In Iraq, Tuberculosis (TB) is a significant public health concern; in 1961, surveys of the community were conducted to detect TB cases using conventional methods such as the Tuberculin Skin Test.[7] The Ministry of Health has established the National Tuberculosis Control Program (NTP) in 1989 with WHO support and introduced the DOTS (Direct Observation Treatment Short Course strategy) in 1998.[8]

In 1980 the MOH started introducing maternal and childhood programs to access, utilize, and provide quality maternity & child health (MCH); this included establishing antenatal care (ANC) and postnatal care (PNC) programs in 1980 and the expanded immunization program in 1985.[9]

Also, the first Guideline of communicable disease control was established in 1999[10] after 2003, there were limited preventive care and public health activities; in 2004, Screening programs for hepatitis B & HIV/AIDS were re-instated.[11]

In 2008 the strategic action plan for the global strategy for prevention and control of non-communicable diseases was endorsed. Finally, the political declaration of the high-level meeting of the general assembly on the prevention and control of non-Communicable diseases was adopted in 2011 and was implemented at 2012, this including screening or early detection and comprehensive care for hypertension and diabetes, prevention of heart attacks and stroke, and screening of selected cancers (breast and cervix).[12]

The Newborn Screening Program (heel prick test) for early identification of newborns errors of metabolism, which are phenylketonuria (PKU), Galactosemia (GAL), also congenital hypothyroidism (CHT) has been started in April 2013 as a pilot project taking two provinces: Baghdad and Karbala as beginning areas.[13]

Determining the frequency of screening is helped by knowledge about the natural history of the condition to be screened for, including the duration of the asymptomatic (latent) phase, thus frequent screening will result in a low number of cases per screen and thus a low predictive value, on the other hand, the infrequent screening will leave the diseases uncontrolled.[14]

OBJECTIVE

- To assess the knowledge of primary healthcare doctors about the timing and schedule of screening programs that applied in Iraq.

CHAPTER TWO: LITERATURE REVIEW

Literature Review: Early detection practices have become a standard component of health services globally, such approach, health screening, is designed to seek out people likely to have a health problem but asymptomatic and thus would not seek care for the problem at that particular time.

Screening is a component of a broader strategy that may include a definitive diagnosis and always includes a plan of action for health promotion and the prevention or control of the disease, for example, screening for cervical cancer is useless unless resources are in place to provide adequate follow-up and treatment for those found to have cancerous or precancerous lesions.[15]

Screening programs seek to maximize the reduction in the incidence of and mortality from a disease given available resources, the appropriate screening interval provides a favorable ratio between the degree of disease control and the cost of screening.[14]

In recent screening frameworks, more attention has been placed on ensuring informed choice, equity and access, quality of care and cost-effectiveness.[16]

Types of screenings

1. Case-finding or opportunistic screening is aimed at patients who consult a health practitioner for some other purpose.
2. Mass screening approaches the level of the population, or major demographic subgroups such as all adults or young children.
3. Multiple (or multiphasic) screening has been defined as applying two or more screening tests to large groups of people.[17]

4. Prescriptive screening is defined as screening for diseases solely for the benefit of the individuals participating in the program. Currently used screening programs are examined at each stage of life-antenatal, postnatal, school age, adult life, and old age.[18]
5. Targeted screening involves screening specific groups of people at higher risk or people with a high-risk score based on their known risk factors, such as environmental and occupational health.[19]

Principles of early disease detection[20]

1) The condition sought should be an essential health problem.
2) The condition's natural history, including development from latent to declared disease, should be adequately understood.
3) There should be a recognizable latent or early symptomatic stage.
4) There should be a suitable test or examination.
5) The test should be acceptable to the population.
6) There should be an agreed policy on whom to treat as patients.
7) There should be an accepted treatment for patients with recognized diseases.
8) Facilities for diagnosis and treatment should be available.
9) The cost of case-finding (including diagnosis and treatment of patients diagnosed) should be economically balanced with possible expenditure on medical care.
10) Case-finding should be a continuing process, not a "once and for all project. "

The test for the disease screening must

1) Be capable of detecting a high proportion of disease in its preclinical state
2) Be safe to administer
3) Be reasonable in cost
4) Lead to demonstrated improved health outcomes
5) Be widely available, as must the interventions that follow a positive result.[21]
6) The accuracy (validity) of the screening test relates to its ability to identify those who have the disease and exclude those who do not. The test should be effective in detecting the early stage of the disease.
7) A screening test should be able to detect most people with the target disease or risk factor (high sensitivity) and be able to exclude most people without the disease or risk factor (high specificity).
8) It should be reliable, give consistent results when used in large populations, and show reproducible results.
9) If the test is positive, it should indicate that the disease is present (high positive predictive value) and, if the test is negative it should indicate that the disease is not present (high negative predictive value).[22]
10) The yield of a screening service is measured by the number of cases identified whose prognosis is improved due to their early detection.[23]

Screening program criteria[24]

1. The screening program should respond to a recognized need.
2. The objectives of screening should be defined at the outset.
3. There should be a defined target population.
4. There should be scientific evidence of screening program effectiveness.
5. The program should integrate education, testing, clinical services, and program management.
6. There should be quality assurance with mechanisms to minimize potential risks of screening.
7. The program should ensure informed choice, confidentiality, and respect for autonomy.
8. The program should promote equity and access to screening for the entire target population.
9. Program evaluation should be planned from the outset.
10. The overall benefits of screening should outweigh the harm.

Disease-specific mortality rates are an important indication of the effectiveness of a screening program. Change in disease-specific mortality rates over time in the target population for screening is perhaps the most important measure of the efficacy of a screening program for a usually fatal disease. Still, changes in disease-specific mortality rates may not be apparent for several years following the commencement of a screening program, and this measure needs to be viewed over the longer term.[15]

2.1 Neonatal Screening Programs

2.1.1 Newborn Bloodspot Screening (NBS): It aims to identify infants at high risk of particular conditions and who would be likely to benefit from early diagnosis and treatment. NBS for phenylketonuria (PKU) and congenital hypothyroidism (CHT) has been in place in most industrialized nations for several decades and has dramatically improved outcomes for affected infants.[25]

Dr. Robert Guthrie introduced the first newborn screening test in the United States for phenylketonuria (PKU) in the early 1960s.[26]

The PKU was identified as a relatively common cause of profound mental retardation which could be avoided if treated soon after birth when the baby was asymptomatic with a low phenylalanine diet.[27]

In the 1970s, the screening began for congenital hypothyroidism (CHT), in the next two decades, a few other disorders like congenital adrenal hyperplasia, hemoglobinopathies, Biotinidase deficiency, cystic fibrosis, and tyrosinemia type I were added sporadically

to the different NBS programs in other states and countries.[28]

In subsequent years, the results of the first NBS programs encouraged the implementation and expansion of new programs in the United States and Europe. Thus, by the end of the 80s, NBS for PKU became universal in most developed countries [29] although the success of this rationale varies between disorders, this guiding principle has led to the expansion of screening from phenylketonuria (PKU) to over 50 diseases now and more on the horizon,[30] in UAE, PKU screening started in1995, in 1998 added CHT, and in 2002 added Sickle cell anemia (SCA).[31]

In Iraq, the newborn screening program was started in April 2013 as a pilot project taking two provinces: Baghdad and Karbala, as starting provinces;[13] the neonatal screening program in Iraq is considered a systematic public health program to screen infants in the first 3 to 5 days after delivery up to 1 month of age that a heel prick blood sample was taken from neonates and sent to a general public health laboratory to screen for Congenital hypothyroidism, Phenylketonuria, and Galactosemia.[32]

2.1.2 Hearing Screening Program: Annually, six per 1,000 live births have sensorineural hearing impairment in low- and middle-income countries in the first month of life compared with two per 1,000 live births in high-income countries.[33]

The Newborn Hearing Screen protocol includes a hearing screen by 1 month of age, early intervention facilitated by earlier diagnosis has been shown to improve speech, language, reading, and communication outcomes into childhood and adolescence. Children with hearing loss identified before 6 months of age and who receive early intervention have significantly better language development at 3 years than those who did not.[34]

Risk factors for neonatal hearing loss include: birth weight less than 1250 grams, prematurity, hypoxia, Apgar score less than three, and 6 in one and five minutes, seizures, meningitis, jaundice, asphyxia, hypoglycemia, and treatment with aminoglycosides and furosemide.

It was noted that hearing loss and brainstem disorder are more common in infants admitted to the American Neonatal Intensive Care Unit (NICU).[35]

Clinical screening for hearing loss in infants and young children was limited to observation of the behavioral response to a sound, such as a ringing bell, introduced out of a direct vision of the child, no studies were found to assess this method; however, the diagnosis of hearing loss in populations relying on this method typically occurs only when the child demonstrates a significant and irreversible language delay and the presence of parental concern about their child's hearing is predictive of actual hearing loss; however, it is not an effective screening tool. Currently, newborn hearing screening is performed via Otoacoustic Emission (OAE) and Automated Auditory Brainstem Response (AABR) testing.[36]

All infants should have access to hearing screening using a physiologic measure (auditory brainstem response (ABR) and otoacoustic emissions (OAE)), at no later than one month of age.

All infants who do not pass the initial hearing screening and the subsequent rescreening should have appropriate audiological and medical evaluations to confirm the presence of hearing loss at no later than three months of age, and once a hearing loss has been diagnosed, the infant and family should have immediate access to early intervention service. This should begin as soon as possible after diagnosis, and no later than 6 months of age.[37]

A study conducted in Iraq in 2016 that the otoacoustic emissions test can be used as a screening test to detect a newborns hearing impairment due to its ease to use, high accuracy, and also it is automated using a pass/fail criterion, which allows trained nonprofessional personnel to perform the test, and also it is an objective and noninvasive test for cochlear function.[39] The Otoacoustic Emission (OAE) is a simple test that takes 15 min and does not disturb the newborn.[36]

2.1.3 Vision Screen in Newborns: In newborns and small infants, congenital cataracts and retinoblastoma are relatively infrequent but can potentially lead to vision loss and even death in the case of retinoblastoma. Early identification of these disorders could lead to earlier treatment with improved outcomes.[39]

The United States Preventive Services Task Force recommends vision screening for all children at least once between the ages of three and five years to detect the presence of amblyopia or its risk factors and concludes that the current evidence is insufficient to assess the balance of benefits and harms of vision screening for children less than three years of age.[40]

In Iraq, a new screening program for early detection of eye and vision disorders in children from birth -to five was started in 2010,[40] the developmental milestones of the vision at the end of 1st month could be examined that the baby can turn his/her head to the light source, follow moving objects, and follow the light pointer at a 1-foot distance (8 to 12 inches).[41]

2.1.4 Neonatal Physical Examination: The Newborn and Infant Physical Examination (NIPE) program's main aims are to identify and refer all children born with congenital abnormalities of the eyes, heart, hips, and (in

males) testes, where these are detectable, within 72 hours of birth, also identify those abnormalities that may become detectable by 6 to 8 weeks of age, at the infant physical examination, finally, it can reduce morbidity and mortality.[42] In Iraq, a routine neonatal examination is done at the first visit for each newborn by checking the general condition of the baby, reflexes, eye, ear, mouth, nose, lymph nodes, chest, lungs, heart, liver, spleen, hernia, genitalia, and hip dislocation.[41]

2.2 Children 1st Month to 59th Months: Developmental monitoring observes how the child grows and changes over time and whether the child meets the typical developmental milestones in playing, learning, speaking, behaving, and moving. Parents, grandparents, early childhood providers, and other caregivers can participate in developmental monitoring.

The American Academy of Pediatrics (AAP) recommends developmental and behavioral screening for all children during regular well-child visits at nine months, 18 months, and 30 months, in addition, the AAP recommends that all children be screened precisely for autism spectrum disorder (ASD) during regular well-child visits at 18 months, 24 months.[43]

2.2.1 Developmental Milestones Fall into Four Categories: Social and emotional, language and communication, cognitive (learning, thinking, problem-solving), movement, and physical development.

There is a checklist for each age group that must be checked at scheduled visits, the scheduled visits are done by the end of 2 months, the end of 4 months, the end of 6 months, the end of 9 months, the end of 12 months, the end of 18months, the end of 2 years, the end of 4 years, and finally at the end of 5 years. It is crucial to act early if there are signs of potential developmental delay because early treatment is essential for improving a child's skills and ability.[9]

2.2.2 Nutritional Assessment: Components of a complete nutritional assessment include a medical history, healthy history including dietary intake, physical examination, and anthropometrics (weight, length or stature, head circumference, mid-arm circumference, and triceps skinfold thickness). (Imbalanced nutritional status adversely affects the health and wellness of individuals. By evaluating the nutritional status of individuals early on, nutritional screening and assessment allow for timely intervention and thus help maintain the health and wellness of individuals and improve quality of life. Timely interventions, especially in specific groups of individuals, such as infants, growing children, pregnant and lactating mothers, help to prevent long-term complications.[44]

2.2.3 Vision Screening: In infancy and preschool-age children, one of the leading causes of vision impairment is amblyopia, known as 'lazy eye', with an estimated prevalence is 1 to 5%, amblyopia decreases visual acuity from one or both eyes, which arises during visual development and is not attributed to a structural alteration of the eye or visual pathways. The main risk factors associated with amblyopia include strabismus (ocular misalignment), significant bilateral refractive errors that cause blurred vision (myopia, hyperopia, astigmatism), and anisometropia (asymmetric retractive error).[39]

2.2.4 Hearing Screen: Children with disabling hearing loss are at risk of delayed speech and language development with consequent poor academic performance, newborn and infant hearing screening, followed by early rehabilitation of positive cases, has been widely promoted in developed countries as an effective form of secondary prevention of disability. In many developing countries, family suspicion of hearing the disorder is still the primary mode of detection of childhood hearing impairment, and diagnosis may not occur until children are two years of age or older; in many developing countries, mothers routinely bring their babies to immunization clinics and such centers may provide an opportunity for an effective infant hearing screening with a broad population coverage.[45] In Iraq, a hearing screen is scheduled for 1st week to 1 month, then at the age of 4 months, nine months, and three years old, the preschool entry screen.[41]

2.3 School Entry Screen: The goals of the health maintenance visit in school-aged children (five to twelve years) are promoting health, detecting disease, and counseling that has a beneficial effect on children's health. Screening Recommendations for school-aged children according to the American academy of pediatrics that children should be screened for obesity (defined as body mass index at or above the 95th percentile for age and sex), and obese children should be referred for intensive behavioral interventions, screening for hypertension (at three years of age or at every health care encounter in those who have risk factors for elevated blood pressure such as obesity, kidney disease, aortic arch obstruction, coarctation of the aorta, diabetes mellitus, taking a medication known to increase blood pressure), vision (at age five, six, eight, 10, and 12 years of age using an age-appropriate visual acuity test, such as a Snellen chart), hearing problems (screening for hearing loss using audiometry at five, six, eight, and ten years of age, and once between 11 and 14 years of age, conduction hearing thresholds greater than 20 dB indicate possible impairment and warrant referral and dyslipidemia once between 9 and 11 years of age; regular screening for risk factors related to social determinants of health is also recommended.[46]

There is insufficient evidence to recommend routine screening for depression before 12 years, still, depression should be considered in children younger than 12 years presenting with unexplained somatic symptoms,

restlessness, separation anxiety, phobias, or hallucinations.[46]

In Iraq, school health services that provide curative and preventive services became provided and implemented through all primary health care centers in 1987.[47] These include vision screening done on newly registered students in primary schools at six years to detect any strabismus, amblyopia, or refractive errors, then the screening is done annually, also the screening involves the students with type 1 diabetes mellitus for retinal examination by ophthalmoscope; early detection of eye diseases is essential to prevent blindness and disability.

Hearing examination and screening are done on all students; suspected children are referred for screening audiometer and tuning fork examination, also the nutritional assessment and psychological assessment are done on all children.[48]

2.4 Premarital Screening: The premarital screening (PMS) program is a medical examination for couples about to get married to prevent diseases that may affect the quality of marriage and the health of future generations and provide premarital health guidance, PMS contains different items in different regions.[49]

Hereditary Blood Disorders are the leading causes of infant and child death, morbidity, and disability in Arab countries, hereditary hematological diseases, especially sickle cell anemia (SCA) and thalassemia, make up one of the region's most common groups of genetic disorders, these are not considered fatal diseases as much as they have an impact on the health of affected individuals that they require a continuous support and health care, which is translated as economic and psychosocial burdens on both the family and society.[50] Testing for HBV, HCV, HIV, and syphilis infections because sexual intercourse is an important route of transmission of infections, the determination of a carrier status during premarital testing will create awareness between the couples, lead to the protection of the prospective spouse by early vaccination which is imperative.[51]

Premarital counseling started in Iraq for an extended period, it has been carried on in many specialized centers distributed throughout the country; premarital screening aims to reduce the incidence of common hemoglobinopathies in Iraq, e.g. thalassemia and sickle cell anemia, to reduce other hereditary disorders by identifying problems followed by counseling, counseling regarding high-risk behaviors, including those related to HIV, Hepatitis B, hepatitis C, syphilis, early detection and treatment of some sexually transmitted diseases.[52]

2.5 Antenatal and Postnatal Care Screenings: After the Alma-Ata Conference held in 1978, mother and child care services were announced as a critical component of primary health care.[53] Antenatal care (ANC), and Postnatal care (PNC) interventions have proven to be critical health interventions to decrease maternal mortality, improving maternal health outcomes requires reinforcement of prevailing evidence-based practices, that the World Health Organization (WHO) recommended several ANC (minimum of four ANC visits) and PNC visits; women should have at least one or more postnatal visits within two days of delivery.[54] According to WHO estimates in 2015, maternal mortality in Iraq fell by 53.3% over the past 25 years, with a mean annual decrease of 3.1%between 1990 and 2015. The Global Burden of Disease (GBD) estimates in 2015, under five-years child mortality in Iraq fell by 33.5% over the past 25 years, with a mean annual decrease of 2.7% between 1990 and 2015. This indicates that Iraq has also made progress in reducing maternal and child mortality.[55]

Ahmed Thani Sadoon and Basim Hussein Bahir mention in their study done in Iraq in 2018 that Antenatal care services provided for pregnant women were fair 78.6%, but 92.9% of PHCCs provided poor postpartum health care services for mothers.[54]

Screenings that were provided during antenatal care in Iraq according to Iraqi guidelines[56]

Assessing pregnancy status at each ANC contact, the recommended number of antenatal care contacts is at least eight in an uncomplicated pregnancy, the timing to assess the pregnancy conditions are:

1) At the first trimester or 1st visit (from the beginning of the pregnancy up to 12 weeks), tests were provided are blood tests such as blood group and Rh, hemoglobin level (Hb%), blood sugar, Hepatitis B and C virus, VDRL, HIV, urine test for proteinuria and asymptomatic bacteriuria, look for signs or symptoms of domestic violence such as trauma, multiple unintended pregnancies, and terminations, delay in seeking ANC, adverse birth outcomes, repeated STIs; symptoms of depression and anxiety; substance use, self-harm, and suicidality.

2) The 2nd visit or in the 2nd trimester (13 weeks to 20 weeks): Repeat weighing and blood pressure (BP) measurement, measuring symphysis–fundal height, offering a second screening for anemia by measuring Hb% and repeating urine test, stool test. An ultrasound scan by a specialist doctor (early ultrasound) are recommended for pregnant women to estimate gestational age, improve detection of fetal anomalies and multiple pregnancies, and reduce the induction of labor for post-term pregnancy, Looking for signs or symptoms of domestic violence.

3) The 3rd visit at 20 to 26 weeks checking is done as in the 2nd visit, in addition, to checking blood glucose tests for all pregnant women and Looking for signs or symptoms of preeclampsia.

4) The 4th visit at 30 weeks or 3rd trimester visit Offer a second screening for anemia by measuring Hb %, repeating urine test in addition to the same checking that is done at the 3rd visit and other visits at 34 weeks, 36 weeks, 38 weeks, and 40 weeks.

5) Check for diabetes mellitus (Screen, all pregnant women between 24th -28th weeks of gestation by Fasting Plasma glucose (FBG) and 75 grams1-hour oral Glucose challenge, and checking for the hypertensive disorder (Screen all pregnant women at every visit).

Postnatal Care of the Mother (up to six weeks after delivery) according to Iraqi guidelines[56]
Assessment of the mother during first postnatal contact at 24 to 48 hours after delivery, assessment of mother during second postnatal contact (first week after delivery preferably on the third day) and third postnatal contact is at (4th-6th week).

Postpartum depression (usually started after the first week of delivery and continue for at least two weeks), while Postpartum blues (usually in the first week of delivery), for gestational diabetes, checking for a blood glucose test to exclude persisting hyperglycemia if blood glucose levels return to normal after the birth by doing a fasting plasma glucose test 6-13week or an HbA1c test, also, offering an annual HbA1c test to the mother who has a negative postnatal test for diabetes. Refer to the hospital if the postnatal test for diabetes was above average level.

A study in Morocco in 2016 about Knowledge and practice related to gestational diabetes among primary health care providers found that 92% of providers reported the timing of screening, and more than half of them (53.3%) indicated that GDM detection should occur in the second trimester and (30.4%) of the responders stated screening is shown in the first trimester of the pregnancy or at the first contact with the woman, fasting glucose as a screening test was mentioned by 90.9% of providers who answered the question on tests.[57]

Another study conducted in Jeddah 2020 about the knowledge of PHCCs doctors about Postpartum Depression (PPD) showed that only 44% did sometimes screening for PPD while 44.5% rarely or never did the screening.[58]

2.6 Non-Communicable Disease Screening: Non-communicable diseases (NCDs), also known as chronic diseases, are medical conditions that are associated with long durations and slow progress; NCDs are non-infectious and are the result of several factors, including genetic, physiological, behavioral, and environmental factors; NCDs are of increasing concern for society and national governments, as well as globally due to their high mortality rate.[59]

According to the World Health Organization (WHO), NCDs are the leading cause of death worldwide, responsible for 71% of deaths each year. The top four killers among NCDs with the highest number of deaths are cardiovascular diseases (17.9 million deaths annually), cancers (9.0 million), respiratory diseases (3.9 million), and diabetes (1.6 million), however, the term of NCDs has been extended to cover a wide range of health problems, such as hepatic, renal, and gastroenterological diseases, endocrine, hematological, and neurological disorders, dermatological conditions, genetic disorders, trauma, mental disorders, and disabilities (e.g., blindness and deafness).[60]

The most effective preventative strategy is the one that leads to changes in lifestyle concerning diet, physical activities, cessation of smoking, and the control of metabolic disorders.[59]

In Iraq, mortality due to NCDs, including heart disease, stroke, chronic lung disease, cancer, and diabetes, accounts for 55% of all deaths, so NCDs are the leading cause of morbidity and death in Iraq (Iraqi Ministry of Health, 2019)[61] around 30% of these deaths occur before the age of 60.[12]

2.6.1 Screening for Hypertension and Cardiovascular diseases (CVD)
Several factors are associated with an increased risk of CVD events, including older age, male sex, high blood pressure, current smoking, abnormal lipid levels, diabetes, obesity, and physical inactivity. High blood pressure is associated with the strongest evidence for causation and has a high prevalence of exposure.[62,63]

Risk factors are combined to estimate a person's risk of a CVD event, several calculators and models quantify a person's 10-year risk of CVD events. The Framingham Risk Score (scoring requires age, sex, race, total cholesterol, HDL cholesterol, systolic blood pressure, blood pressure-lowering medication use, diabetes status, and smoking status) based on data from the Framingham Heart Study, was one of the first widely used CVD risk assessment tools. Persons with a 10-year CVD event risk more significant than 20% are generally considered high risk, those with a 10-year CVD event risk of less than 10% are considered low risk, and those with a 10-year CVD event risk of 10% to 20% are regarded as intermediate risk.[63]

The American Heart Association (AHA) recommends screening for hypertension for adults beginning at the age of 20; Evidence is lacking to recommend an optimal interval for screening adults for hypertension. The seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7) recommends screening every two years in persons with blood pressure less than 120/80 mm Hg and every year in persons with a systolic

blood pressure of 120 to 139 mm Hg or diastolic blood pressure of 80 to 90 mm Hg.[64]

The United States Preventive Services Task Force (USPSTF) recommends that blood pressure screening applies to adults 18 years or older without known hypertension, initial screening for hypertension should be performed with office blood pressure measurement that the office blood pressure measurement is most commonly performed using a manual or automated sphygmomanometer.[65]

In Iraq, People who attend PHCCs above 20 should be screened for hypertension, and people who attend PHCCs age 40 and above should be screened for diabetes mellitus, patients who are already diagnosed with these diseases and pregnant women are not included in this program.[66]

In a study in Saudi Arabia in 2001 by Al-Khashman AS about Screening for hypertension, knowledge of PHCCs doctors resulted in the majority of doctors 94% recording blood pressure at the time of opening the Family Health Records file. Still, only 56% of doctors would screen patients above 35 years of age every 3-5 years.[67]

Another study conducted in Cairo, 2007 showed that the participating physicians had poor knowledge of some important items regarding Hypertension that only 46.2% routinely screen patients around forty years old, while only 43.7% were regularly checking up on the accuracy of the used sphygmomanometers.[68]

For CVD, screening begins at the age of 40 years old by the WHO/ISH risk prediction charts indicate a 10-year risk of a fatal or nonfatal major cardiovascular event (myocardial infarction or stroke), according to age, sex, blood pressure, smoking status, total blood cholesterol and the presence or absence of diabetes mellitus for 14 WHO epidemiological sub-regions, the charts provide approximate estimates of CVD risk in people who do not have established coronary heart disease, stroke, or another atherosclerotic disease, they are useful tools to help identify those at high cardiovascular risk and motivate patients, particularly to change behavior and, when appropriate, to take antihypertensive, lipid-lowering drugs, and aspirin. There are two sets of charts, one set (14 charts) can be used in settings where blood cholesterol can be measured and the other set (14 charts) is for settings where blood cholesterol cannot be measured; 10-year risk of a cardiovascular event can be less than 10%, 10 to less than 20%, 20 to less than30%, equal to30% or more.[69]

2.6.2 Screening for Diabetes Mellitus: Diabetes mellitus is one of the most common diagnoses made by family physicians; Uncontrolled diabetes can lead to blindness, limb amputation, kidney failure, and vascular and heart disease. The U.S. Preventive Services Task Force recommends screening for abnormal blood glucose and diabetes type 2 in adults 40 to 70 years of age who are overweight or obese and repeating testing every three years if results are normal. Individuals at higher risk should be considered for earlier and more frequent screening.[70]

The American Diabetes Association recommends screening for type 2 diabetes in patients 45 years and older if tests are regular, repeat testing carried out at a minimum of 3-year intervals is reasonable, sooner with symptoms, in patients younger than 45 years with significant risk factors;[71] that is also implemented in Iraq, for all people a national screening system program for diabetes started at the age of 40 years, in addition testing for type II diabetes in asymptomatic people should be considered in adults of any age who are overweight or obese (BMI $\geq$25 kg/m^2) and who have one or more additional risk factors for diabetes such as first degree relative with diabetes, history of cardiovascular disease, hypertension or on therapy for hypertension, and women with polycystic ovary syndrome.

For testing, fasting plasma glucose or random blood sugar is done, positive screening results are defined as a fasting plasma glucose level of 126 mg/dl or more (equal to or more than 7 mmol/L) or a random plasma glucose level of 200 mg/dl (11.1 mmol/l)or more. Individuals with pre-diabetes (impaired plasma glucose) should be tested yearly, if tests are normal repeated testing should be carried out at a minimum of 3-year intervals.[72]

A study done in Saudi Arabia 2021, showing low adherence to screening for diabetes mellitus that displayed poor knowledge related to screening, however, this study was done among Health Care Professionals at a tertiary care hospital.[73]

2.6.3 Osteoporosis Screening: Osteoporosis is a disease in which the density and quality of bone are reduced, as bones become more porous and fragile, fracture risk is significantly increased, the loss of bone occurs silently and progressively and often there are no symptoms until the first fracture occurs. Osteoporosis affects many people of both sexes and all races, around the world, one in three women and one in five men are at risk of an osteoporotic fracture and the most common fractures associated with osteoporosis occur at the hip, spine, and wrist, fractures may be followed by complete recovery or chronic pain, disability, and death.[74]

Osteoporosis is preventable and treatable, but due to the absence of warning signs before a fracture, many people are not diagnosed in time to receive effective therapy during the early phase of the disease.[74]

Measures for osteoporosis prevention should begin in childhood and include physical activity, balanced nutrition, and avoidance of risk factors such as smoking and alcohol use. In adulthood, early recognition of the disease before the occurrence of fractures followed by

timely and effective initiation of appropriate treatment can reduce fracture risk.[75]

The USPSTF recommends screening for osteoporosis with bone measurement testing to prevent osteoporotic fractures in all women aged 65 years and above, and postmenopausal women younger than 65 years who are at increased risk of osteoporosis, as determined by a standard clinical risk assessment tool, at the same time, in men, the USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening for osteoporosis to prevent osteoporotic fractures in men.

The most commonly used bone measurement test used to screen for osteoporosis is central DXA (dual-energy X-ray absorptiometry), central DXA measures bone marrow density (BMD) at the hip and lumbar spine. Most treatment guidelines recommend using BMD measurement by central DXA to define osteoporosis and the treatment threshold to prevent osteoporotic fractures.

Quantitative ultrasound, Peripheral quantitative computed tomography, and peripheral DEXA are devices also used in screening when central DEXA is not available, but there are no studies reviewed by the USPSTF that define the treatment threshold by using these measurements; they cannot be routinely used to initiate treatment without further central DXA measurement, about screening interval, there is limited evidence that found no benefit in predicting fractures from repeating bone measurement testing 4 to 8 years after initial screening.[76]

The DEXA scores are reported as T-scores" and Z-scores; the T-score compares a person's bone density with that of a healthy 30-year-old of the same sex, and the Z-score compares a person's bone density with an average person of the same age and sex.

Lower scores mean lower bone density:

- A T-score of -2.5 or lower qualifies as osteoporosis.
- A T-score of -1.0 to -2.5 signifies osteopenia, meaning below-normal bone density without full osteoporosis.

Multiplying the T-score by 10% gives a rough estimate of how much bone density has been lost.

Z-scores are not used to diagnose osteoporosis formally. Low Z-scores can sometimes be a clue to looking for a cause of osteoporosis.[77]

In Iraq, it recommended screening for osteoporosis in men at age 70 years old and older or less than 70 years old if they had a risk factor (s), while in women, recommendation to start screening at age 65 years and older and earlier if they had risk factor (s), by referral to the rheumatologist for BMD measurement. Also, recommend referral for:

- Adults with a fragility fracture.
- Adults with a disease or condition associated with low bone mass or bone loss, adults taking medications associated with low bone mass or bone loss,
- Anyone being considered for pharmacologic therapy, anyone being treated to monitor the treatment effect,
- Anyone not receiving therapy in whom evidence of bone loss would lead to treatment, and women discontinuing estrogen.[74]

In a study conducted in Netherlands 2011 about doctors' knowledge of corticosteroid-induced osteoporosis, their result was that approximately 21% of all doctors in their study chose not to do anything for 65 years old women treated with 5 mg prednisolone despite guidelines recommending BMD testing in women >65 years regardless of another risk.[78]

2.6.4 Cancer Screening: Worldwide, an estimated 19.3 million new cancer cases and almost 10.0 million cancer deaths occurred in 2020.[79]

Breast and lung cancers were the most common cancers worldwide, contributing 12.5% and 12.2% of the total number of new cases diagnosed in 2020, colorectal cancer was the third most common cancer, with 1.9 million new cases in 2020, contributing 10.7% of new patients, prevention of cancer is one of the most significant public health challenges of the 21st century.[80]

The World Health Organization has defined two distinct but related strategies to promote the early detection of cancer: early diagnosis, which is the recognition of symptomatic cancer at an early stage, and screening, which is the identification of asymptomatic disease in a target population of apparently healthy individuals. In low-income and middle-income countries, a large proportion of women with breast cancer present or ultimately are diagnosed with later stage (locally advanced or metastatic) disease.[81]

The goal of cancer screening and early detection is to cure cancer by detecting the malignancy, or its precursor lesion, at an early stage before the onset of symptoms when treatment of cancer is most effective, overall cancer mortality has decreased by 25% from 1990 to 2015 in the United States, with even more significant declines in the mortality rates for colorectal cancer (47% among men and 44% among women) and breast cancer (39% among women), the portion of this decrease can be attributed to introducing high-quality cancer screening for colorectal and breast cancer. The most successful cancer screening programs lead to the identification of precursor lesions (for example, cervical intraepithelial neoplasia (CIN) with cervical cancer screening and colonic polyps with colorectal cancer screening), where the treatment of the precursor lesion leads to a decrease

in the incidence of invasive cancer over time, not all cancer screening recommendations meet each of these guiding principles; historically there has been a balance between the identification of early or precursor lesions and the avoidance of overdiagnosis which may lead to overtreatment.[82]

In Iraq, the top five most frequent cancers in 2020 are breast, lung, colorectum, leukemia, and non-Hodgkin lymphoma. The most common cancers in men are lung, colorectum, and prostate. In women are breast, thyroid, and leukemia, most of the new cases of cancers are predominant in females.[83]

Breast Cancer and Cervical Cancer Screening: Breast cancer constitutes about one-fourth of the registered cancer cases among the Iraqi population, and it is the leading cause of death among Iraqi women; the World Health Organization (WHO) documented that early detection and screening, when coped with adequate therapy, could offer a reduction in breast cancer mortality. As the primary screening tools for breast cancer, Mammography machines are available in the foremost hospitals only in each province in Iraq that yet, those are mainly used for diagnostic purposes in patients who present with palpable breast lumps, resulting in promotion of other feasible tools such as Clinical Breast Examination (CBE) for women, by highly trained health care providers in PHCCs, along with diagnostic mammography in the foremost hospitals for referred cases, could offer cost-effective approaches for early detection of breast cancer in Iraq, the resources required to provide these services are within reach of all countries with limited resources.[84] In 2009 breast cancer screening guidelines, the U.S. Preventive Services Task Force recommended against teaching breast self-examination (grade D recommendation) based on the lack of evidence regarding benefits and because of potential harms from false-positive findings.[85]

Also, the American Cancer Society (ACS) no longer recommends a clinical breast exam (CBE) as a screening method for women in the U.S Breast self-exam is also no longer recommended as an option for the women of any age because of the lack of evidence regarding improved outcomes.[86]

Although no studies in the United States have directly examined the effectiveness of breast self-awareness, based on the frequent incidence of self-detected breast cancer, patients should be counseled about breast self-awareness.[87]

Iraqi physicians are expected to perform CBE for women starting at the age of 20 years as a part of their routine check-up every 2-3 years, increasing to once a year from the age of 30. All women should be encouraged to have monthly BSE after age 20; the best time to perform BSE is after the end of menstruation, precisely 7-10 days from the start of the menstrual cycle, when the breasts are less engorged or tender, for pregnant and postmenopausal women, localizing a particular day each month is recommended and in lactating women BSE should be carried out after evacuating the milk, once an abnormality is detected, the patient should be referred for mammography and other relevant diagnostic investigation.

Mammography is the only proven gold-standard method for detecting non-palpable (occult) cancers and "Minimal" breast cancers, the latter category includes lobular carcinoma in situ, non-invasive intraductal carcinoma, and minimal invasive carcinoma with a mass no greater than 0.5 cm. in diameter. The schedule of the Iraqi Program for Screening for Breast Cancer is the following table:[88]

Table 2.6.4: The Schedule of the Iraqi Program for Screening for Breast Cancer.

A. For low-risk women				
Test	Age (in years)			
	20-29	30-39	40-49	≥50
BSE	Monthly	Monthly	Monthly	Monthly
CBE	Every 2-3 years	Every year	Annually	Annually
Mammogram	-------	-------	Every 2 years	Annually
B. For high risk women				
Test	20-29	30-39	40-49	≥50
BSE	Monthly	Monthly	Monthly	Monthly
CBE	Annually	Annually	Annually	Annually
Mammogram	--------	Every 3 years (with annual ultrasound)	Annually	Annually

In a study done in Egypt 2010, results showed that PHC doctors' adherence to guidelines in ordering mammograms was low, while the lack of knowledge about the guidelines and recommendations for breast cancer screening was higher among junior doctors (as the study was comparative between senior and junior PHCs doctors).[89]

Cervical cancer was probably the most frequent malignancy in western Europe in the middle of the 19th century, its natural history makes it detectable in its

preclinical phase and increases the chances of cure and mortality reduction. Papanicolaou (Pap) test was widely used as a screening tool in the late 1940s to early 1950s.[4]

Cervical cancer is the fourth most common cancer in women, in 2018 an estimated 570 000 women were diagnosed with cervical cancer worldwide, and about 311 000 women died from the disease. Almost all cervical cancer cases (99%) are linked to infection with high-risk human papillomaviruses (HPV), especially HPV16 and 18, a widespread virus transmitted through sexual contact, although most infections with HPV resolve spontaneously and cause no symptoms, persistent infection can cause cervical cancer in women.[90]

The survival rate of cervical cancer is directly related to the stage of diagnosis, patients with an early diagnosis have a significantly higher survival rate than those suffering from metastatic disease (91% vs 14%).[91]

According to the World Health Organization (WHO), the annual incidence and mortality of cervical cancer in Iraq are estimated at 2.1 and 1.4 per 100000, respectively with the total number of newly diagnosed cases equal to 311, the total number of death equals 212 this figure gives a cumulative risk of 0.3% for women ages 0-74 years, compared to the western world, the low incidence of cervical carcinoma in Iraq and other Islamic countries, although the incidence of this cancer in Iraq is relatively low, the majority of cases found are usually in advanced stages with poor prospects for treatment.[88]

The cervical screening in Iraq starts at the age of 25 to 50 years old in the high-risk group women and every three years, the patient after the age of 30 is referred for co-testing.[92]

In a study conducted in Turkey in 2014, the result was only 25.9% of participants knew when one should start having pap smear tests answered correctly, and 70.6% of them knew in which frequency one should have pap smear testing answered correctly although this study was among PHCCs females health workers(doctors, midwives, nurses).[93]

2.7 Tuberculosis Screening: Tuberculosis (TB) is mainly an airborne disease caused by the bacterium Mycobacterium tuberculosis, which spreads when the infected people exhale it into the air. The typical site of infection is the lungs (pulmonary TB) and it is the most common type of this disease, although it can also spread to the other parts of the body (extrapulmonary TB) such as the spinal cord, brain, and kidneys. Despite of TB's high prevalence, it is preventable and treatable.[94]

TB infection is one of the most common infections and the leading cause of death due to infectious diseases in the world. In 2019, it is estimated that nearly two billion people (about one-fourth of the world's population) are infected with M. tuberculosis, about 10 million people develop TB disease every year, and 1.6 million people die of it.[95]

Iraq is considered to be a middle burden country with TB and occupies rank 108 globally and 7 in the eastern Mediterranean region among countries with TB burden size; according to the WHO report, the estimated incidence of TB in Iraq is 45/100000 population (I.e. estimated total new TB cases is around 15000 per year), while the prevalence is 74/100000 and the mortality is 3/100000.[8]

Latent tuberculosis infection (LTBI) is when humans are infected with M. tuberculosis without any clinical symptoms, radiological abnormality, or microbiological evidence that one-third of the world's population is infected with TB, and the prevalence rate of LTBI in low- or middle-income countries is estimated to be as high as 51.5%, while that in high-income countries is 28.1%.[96]

Systematic screening for active TB can be done for the whole population (mass screening) or be targeted at selected risk groups; among those whose screening is positive, the diagnosis needs to be established using one or several diagnostic tests and additional clinical assessments, which have high accuracy.

The primary goal of detecting active TB early is to reduce the risk of poor treatment outcomes, health sequelae, and the adverse social and economic consequences of TB for the individual, also reduces suffering, the prevalence of TB, and death from TB; reducing TB transmission by shortening the duration of infectiousness that reduces the incidence of TB infection and consequently contributes to reduced incidence of TB disease.[97]

The Ministry of Health of Iraq established the National Tuberculosis Control Program (NTP) in 1989 with WHO support and introduced the DOTS (Direct Observation Treatment Short Course) strategy in 1998.
The DOTS strategy required five conditions:

1. The political will of the government.
2. Existence of laboratories network to identify smear-positive pulmonary TB patients.
3. A network of peripheral health centers.
4. Regular supply of drugs and reagents.
5. Organization of a permanent surveillance system to supervise the program's tasks and evaluate its epidemiological impact.

TB screening is applied to:

- Any individual with an unexplained persistent cough for two weeks and more with no response to treatment.
- HIV-positive patient.
- Long-term steroid therapy.
- Diabetic patient, cancer patient.

- People from congregated settings (refugee camps, homeless shelters, and prisoners).
- Contact with suspected or confirmed pulmonary TB or drug-resistant TB, medical health worker because they are at risk of exposure to TB.[8]

Frequency of Screening in individuals with initial negative tests: Annual testing for individuals living or working in congregate settings (mandated) and periodic testing for individuals with possible new exposure to TB (contact to a pulmonary/laryngeal TB cases, prolonged/frequent travel, or new medical risk factor).[98]

HIV (Human Immunodeficiency Virus) /AIDS (acquired immunodeficiency syndrome) (HIV/AIDS) and TB are so closely connected that the term "co-epidemic" or "dual epidemic" is often used to describe their relationship, the intersecting epidemic is usually denoted as TB/HIV or HIV/TB, HIV affects the immune system and increases the likelihood of people acquiring a new TB infection. It also promotes both the progression of latent TB infection to active disease and relapse of the disease in previously treated patients.

TB is one of the leading causes of death in HIV-infected people also, HIV infection is the most potent risk factor for converting latent TB into active TB, while TB bacteria accelerate the progress of Acquired immunodeficiency syndrome (AIDS) infection in the patient, many people infected with HIV in developing countries develop TB as the first manifestation of AIDS.[99]

In Canada in 1997, a survey was done about the knowledge of family physicians about TB prevention, and the result was more than 90% had good knowledge regarding the need to screen a person for TB, slightly lower percentage recognize that HIV/AIDS patients should have the screening test and only 16 % acknowledge that patient with chronic diseases should have a screening test.[100]

The COVID-19 pandemic and response measures, including lockdowns and the reorientation of health services, have disrupted essential health services for other diseases, including TB, HIV and malaria. For TB, reductions in case detection due to the COVID-19 pandemic are projected to result in increased TB transmission, morbidity and mortality.[101]

2.7 HIV Screening: HIV (human immunodeficiency virus) is a virus that attacks the body's immune system. If HIV is not treated, it can lead to AIDS (acquired immunodeficiency syndrome). There is currently no effective cure, once people get HIV, they have it for life.[102]

HIV can be transmitted via the exchange of various body fluids from infected people, such as blood, breast milk, semen, and vaginal secretions, HIV can also be transmitted from a mother to her child during pregnancy and delivery. According to WHO, HIV continues to be a major global public health issue, having claimed 36.3 million [27.2–47.8 million] lives with HIV infection, over two-thirds of whom (25.4 million) are in the African Region, and it will need to redouble the efforts to avoid increasing HIV infections due to HIV service disruptions during COVID-19, and the slowing public health response to HIV.[103]

Clinicians should test for HIV routinely in their practices, with repeat HIV testing in persons who inject drugs, have multiple sexual partners, exchange sex for money or drugs, or have incident sexually transmitted infections. Persons with a new diagnosis of HIV infection should be promptly referred to a clinical setting where a full HIV assessment can be performed, and antiretroviral therapy can be initiated rapidly, long-term retention in care and maintenance of successful antiretroviral treatment allows persons with HIV infection to have a near-normal life span and virtually eliminate transmission of HIV to others.[104]

Iraq is considered a country with a low-level epidemic of HIV/AIDS, which affects most at-risk population groups, the prevalence of HIV in Iraq is currently less than 0.1% of the population. Still, associated vulnerability and risk factors continue to increase due to liberalized trade relations and increased drug use. In December 2014, less than 100 people living with HIV were reported, from 1986 to 2014, a slight increase occurred in officially reported HIV cases, half of which were nationals and half foreigners and the majority were males, with more than half of them aged between 15 and 29 years, and of reported cases, 57% were infected by blood transfusion and blood products, though the sexual transmission has become the main documented transmission mode since 2003.[105]

After the first HIV cases had been identified in Iraq, the government gradually introduced HIV testing for a large number of categories, such as blood donors, clinically suspected cases, STI patients, patients with hemophilia and thalassemia, newly diagnosed TB patients, patients with hepatitis B and C infections, patients on hemodialysis, pregnant women who are at risk of HIV infection, premarital testing, newborn of HIV infected mothers, contacts of HIV positive cases, prisoners with sexual offenses, travelers to Iraq, health workers, long-distance drivers and workers in tourism. HIV testing is mandatory for prisoners convicted of sexual offenses, travelers to Iraq, blood donors, newly diagnosed tuberculosis cases, and those who are getting married. HIV testing in prisons involves those prisoners detained/imprisoned for sexual offenses, and there is systematic and regular testing of prisoners, and the prison system does not offer specific HIV services to inmates other than counseling and testing.[106]

In a study done in USA 2015, the primary health care physician participants reported not routinely testing for HIV or screening.[107] Another study in Turkey 2021, found that healthcare workers are professionally educated health service providers responsible for providing accurate and reliable information to society about diseases, preventive precautions, and treatments and for this reason, in-service education in the health field is important in keeping up to date.[108]

Screening and COVID 19: The global COVID-19 pandemic has presented extraordinary disruption to healthcare services and exposed them to numerous challenges. Regarding Newborn screening (NBS) programs were affected but in general, NBS has been less severely affected by COVID-19 than other healthcare delivery aspects.[109]

COVID-19 is believed to have influenced cancer screening programs; short-term (3-6 months) and long-term (>12 months), interruption of cancer screening will delay the diagnosis of cancers and cause a shift in favor of more advanced cancers. Changes in cancer services due to international pandemic measures are expected to result in many additional cancer deaths. A significant decline in cancer screening and biopsy sampling is likely to reduce cancer diagnosis rates in the short term, for a long time increases cancer diagnosis rates, advanced cancers, mortality rates, and years of life lost.[110]

Regarding antenatal care, a recent systematic review and meta-analysis reported that during the COVID-19 pandemic, there was about a 38% decline in antenatal care (ANC) appointments globally due to fear of infection and altered functioning of health facilities common reasons.[111]

CHAPTER THREE: SUBJECTS AND METHODS SUBJECTS AND METHOD

3.1 Study design

A cross-sectional study with analytic element, conducted in Baghdad, Iraq from 2nd Jan _30th June 2022.

3.2 Study setting

The study was conducted in 30 PHCCs (Appendix 1) in Baghdad from Al-Karkh and Al-Resafa directorates, a simple random sampling has been used to select the PHCCs. By choosing 15 PHCCs from Al karkh and 15 PHCCs from Al Resafa directorates, all Al Karkh PHCCs names were written in separate papers and mixed in a bag and 15 PHCCs were chosen, and same thing done to Al Resafa PHCCs.

Inclusion criteria: All doctors who work at chosen PHCCs only and present at the time of the researcher's visit and who accepted to be involved in this study.

Exclusion Criteria: Doctors who were not found during researcher visit day and doctors who were included in the pilot study.

3.3 Sample Size

There were 166 doctors enrolled in this study, and 11 of them refused to fill the questionnaire due to either being busy or not interested, or tired from work, so the sample size was 155 from chosen PHCCs. with response rate 93.3%.

3.4 Pilot Study

A random sample was chosen from the PHCCs doctors for the pilot study before conducting the definitive study out of the number of total participants from AL Mansour and Al Zahraa Al Namoddaji PHCCs, these PHCCs were included in the study. The number of them was ten doctors, the pilot study was conducted in February 2022 to evaluate the content of the study questionnaire to ensure understanding and clearance of the questions for the PHCCs doctors and the time needed for filling the questionnaires, and these ten doctors were excluded in the main study.

3.4 Study Tools

A self-structured paper questionnaire was employed to assess the Knowledge of PHC doctors about the timing and schedule of screening tests and examinations done in Iraq, and was only in English version because of the participants are doctors. (Appendix2).

The questionnaire was formed depending on the guidelines of MOH of Iraq, and tested by three family physicians and two community physicians.

The questionnaire was divided into eleven sections: demographic and general screening knowledge variable, newborn screenings[13], children's 1st month to 59 months screenings[9,41], preschool screenings,[47,48] premarital screen,[52] antenatal screen, postnatal screen,[56] cancer screening programs,[88,92] non-communicable diseases screenings,[66,69,72,74] TB screen[8] and, HIV screen.[106]

I. The demographic and general screening knowledge: made of 14 questions about:

- The name of PHCCs and the directorate (Al Karkh, Al Resafa), age (years).
- Gender (male, female),
- Marital status: Single, married, divorced, widow.
- Job description: Graduated doctors" doctors who were graduated since 2 to 3 years and working at PHCCs", board students" post graduate students", GP "general practitioners", specialists" doctors with board or diploma degrees)
- Years of experience: (≤5, 6-10, 11-15, 16-20, > 20).
- Having a training course about screening programs (Yes, No)
- Availability of screening guidelines in the PHCs (Yes, No), If yes: Accessibility to these guidelines (Yes, for all, No for all, Yes, few of them),
- General screening knowledge which are three questions.

I. Newborn screenings: from delivery up to one month, and made of 7 questions to assess knowledge about the timing of newborn screenings.
II. Children's 1st month to 59 months screenings: made from 8 questions.
III. Preschool screen: made of 6 questions.
IV. Premarital screen: made of 4 questions.
V. Antenatal screen: include the period from the beginning of the pregnancy to the delivery of the baby, made from 11 questions.
VI. Postnatal screen: The period from delivery of the baby up to six weeks postpartum made of 5 questions.
VII. Cancer screen: include breast and cervical screening, made of 7 questions.
VIII. Non-communicable diseases screening: include hypertension, diabetes mellites screen, CVD, osteoporosis screening programs and made of 10 questions.
IX. TB screen: made of 9 questions.
X. HIV screen: made of 10 questions.

3.5 Data Collection: Data collection was done by visiting the selected primary healthcare centers, meeting the doctors, and being given a paper questionnaire used for this purpose; the questionnaire took 12 to 15 min to fill. The time for data collection was about two months (March and April), and the remaining time was for conducting other parts of the study.

3.6 Data Analysis: For data analysis, the data was inputted in the statistical package for social sciences version 26 (SPSS 26), continuous variables were presented as means and stander deviations (SD), and categorical variables were presented as numbers, frequencies and, percentages.

- **Knowledge scoring:** Further analysis included the calculation of knowledge, the knowledge score was computed as: If the correct answer was provided scores 3, For (I don't know) scores 2, for the incorrect answer provided score was 1, the physicians' total scores were tabulated and then will be crosstabs with the demographic data:

1) 'Poor' knowledge score was considered when a physician scored less than 50% of total scores from the mean.
2) 'Fair' knowledge of total screening, when a physician scored 50%-75% of total score.
3) 'Good' knowledge of the total screening, when a physician scored equal or more than 76%. Chi-square test for independence was used to test the significance of association between discrete variables. Findings with a P value less than 0.05 were considered significant.

3.7 Ethical Considerations: The ethical approval for conducting the study was obtained from The Arab Board of Health Specializations and Ministry of Health of Iraq, Iraqi National Cancer Research Center/the University of Baghdad and from, the AL-Resafa and AL-Karkh Health Directorates and their sectors, and Permission of all the PHCCs managers was obtained during the study (appendix3). The doctors were ensured about the confidentiality of collected information, that the data would be used for research purposes only, and addition of sentence to the beginning of the questionnaire explain purpose and benefit and the freedom to enroll in this study in addition to verbal consent was obtained from the participants.

CHAPTER FOUR: THE RESULTS

THE RESULTS

One hundred and fifty-five PHCCs doctors enrolled in this study, the highest percentage is from Al-Resafa directorate 87 (56.1%), aged between 30-39 with mean=36.78, and SD=9.124, most of them are females121 (78.1%), married 117(75.5), and most of them are Board students 46(29.7%) with years of experience less than or equal to 5 years 44 (28.4%) as shown in table (1).

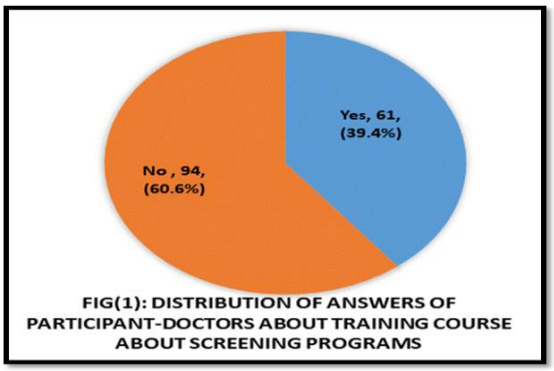
Table (1): Distribution of participant doctors according to their Directorate, Age, Gender, Marital status, Job description, and Years of experience.

		Frequency	Percentage
Directorate	Karkh	68	43.9
	Resafa	**87**	**56.1**
Age M±SD=36.78±9.124	≤29	39	25.2
	30 – 39	**64**	**41.3**
	40 -49	33	21.3
	≥ 50	19	12.3
Gender	Male	34	21.9
	Female	**121**	**78.1**
Marital status	Single	34	21.9
	Married	**117**	**75.5**
	Previous married	4	2.6
Job description	Graduated doctors*	31	20
	Board students**	**46**	**29.7**
	General practitioners	34	21.9

	Specialists	44	28.4
Years of experience	**≥5**	**44**	**28.4**
	6-10	36	23.2
	11-15	29	18.7
	16-20	19	16.3
	>20	27	17.4
Total		155	100.0

*Graduated doctors" doctors who were graduated since 2 to 3 years and working at PHCCs", ** board students" post graduated students"

Most of the participating doctors 94 (60.6%) did not take any training courses about screening programs as shown in figure (1):



FIG(1): DISTRIBUTION OF ANSWERS OF PARTICIPANT-DOCTORS ABOUT TRAINING COURSE ABOUT SCREENING PROGRAMS

Also, majority of the participants (71%) stated that screening guidelines available in their PHCCs (fig.2), and only[23] were fully accessible to all guidelines,[22] were accessible to few of them where[55] stated that it was not easy to get them as shown in figure (3):

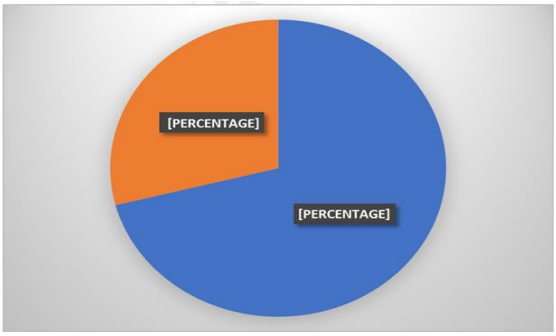


Fig (2): Distribution of participants doctors about their knowledge of guidelines availability.

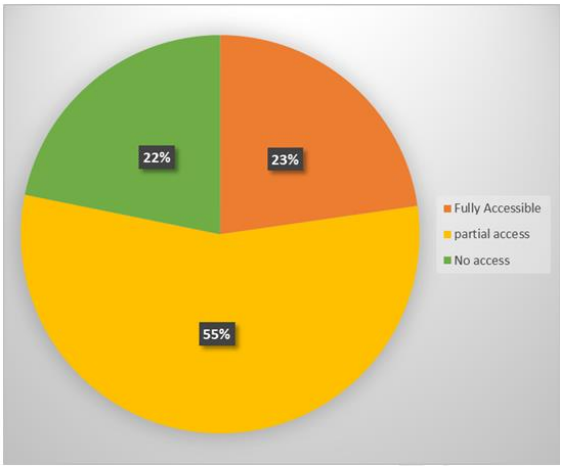


Fig (3): Distribution of participants doctors about the accessibility to the guidelines at their PHCCs, N=110.

Regarding the participants' screening knowledge all of them had fair knowledge in specific and overall screening knowledge as shown in table below:

Table (2): distribution of participants doctors according to their knowledge in general and specifics screening programs are done in Iraqi PHCCs.

		Freq.	%
General knowledge	Good general knowledge	52	33.5
	Fair general knowledge	**70**	**45.2**
	Poor general knowledge	33	21.3
Neonatal screening knowledge	Good neonatal knowledge	22	14.2
	Fair neonatal knowledge	**102**	**65.8**
	Poor neonatal knowledge	31	20.0
Child 1st month to 59th months screening knowledge	Good knowledge	9	5.8
	Fair knowledge	**125**	**80.6**
	Poor knowledge	21	13.6
Preschool screening knowledge	Good knowledge	17	11.0
	Fair knowledge	**111**	**71.6**
	Poor knowledge	27	17.4
Premarital screening knowledge	Good knowledge	47	30.3
	Fair knowledge	**100**	**64.5**
	Poor knowledge	8	5.2
Antenatal and postnatal knowledge	Good knowledge	13	8.4
	Fair knowledge	**119**	**76.8**
	Poor knowledge	23	14.8
Non- communicable diseases and cancer screening knowledge	Good knowledge	14	9.1
	Fair knowledge	**130**	**83.9**
	Poor knowledge	11	7.0
TB and HIV screening knowledge	Good knowledge	65	41.9
	Fair knowledge	**82**	**52.9**
	Poor knowledge	8	5.2
Overall screening knowledge	Good knowledge	16	10.3
	Fair knowledge	**129**	**83.2**
	Poor knowledge	10	6.5
Total		155	100.0

General Screening: The response of participants regarding general screening knowledge was that 126 (81.3%) of them knew the definition of screening, only 59(38.1%) said that screening tests are not used to diagnose the diseases, and 130 (83%) knew that screening tests were done at regular intervals or when the person reaches a certain age, as shown in Table (3).

Table (3): Distribution of participant doctors according to their answers about screening in general: (Notes: In all following tables: Idk = I don't know, Freq.= frequency, %= percentage).

		Freq.	%
Screening refers to the application of a medical procedure or test to people who as yet have no symptoms of a particular disease to determine their likelihood of having the disease.	Idk	20	12.9
	No	9	5.8
	Yes (correct)	126	81.3
The screening procedure used to diagnose the illness	Idk	11	7.1
	Yes	85	54.8
	No (correct)	59	38.1
Screening tests are done at regular intervals like once a year or once in two to three years, or when a person reaches a certain age.	Idk	10	6.5
	No	15	9.7
	Yes (correct)	130	83.9
Total		155	100.0

The general screening knowledge of the participants was 52(33.5%) were good knowledge, 70(45%) were fair knowledge and 33(21.3%) were poor knowledge. According to their demographic data, the general screening knowledge was not significant to the age, gender, marital state, job description, and years of experience as shown in the table (4).

Table (4): Distribution of participants doctors demographic data with the general screening knowledge.

		Total general knowledge			Total	P-value
		Poor	Fair	Good		
Totals		**33**	**70**	**52**	**155**	
Age	≤29	9	12	18	39	0.126
	30 - 39	11	33	20	64	
	40 -49	11	15	7	33	
	≥ 50	2	10	7	19	
Gender	Male	9	19	6	34	0.085
	Female	24	51	46	121	
Marital Status	Single	11	8	15	34	0.090
	Married	22	59	36	117	
	Previous married	0	3	1	4	
Job Description	Graduated doctors	8	12	11	31	0.084
	Board students	6	20	20	46	
	GP	12	17	5	34	
	Specialists	7	21	16	44	
Years of experience	**≥5**	10	13	21	44	0.096
	6 to 10	5	20	11	36	
	11 to 15	5	16	8	29	
	16 to 20	6	11	2	19	
	>20	7	10	10	27	

Newborn screening: The response of participants regarding newborn screening programs was 130(83.9%) knew that there are newborn screening programs, 122(78.7%) of them answered correctly about the timing of the heel prick test, 111(71.6%) of them knew that a hearing screen must be done to all newborns, only 33 (21.3%) knew that vision screen done at 1st visit, 99(63.9%) of them knew that Screening for cryptorchidism in the male newborn baby at the first visit, 54(34.8%) knew that Screening for congenital hip dysplasia at first visit for all newborns, and 93(60%) knew Screening for congenital heart disease at 1st visit for all newborns as shown in table (5).

Table (5): Distribution of participant doctors according to their answers about newborn screening programs.

		Freq	%
Do we have a newborn screening in Iraq?	Idk	8	5.2
	No	17	11.0
	Yes (correct)	130	83.9
Newborn blood spot heel prick test must be done at 3 to 5 days of life to one month.	Idk	24	15.5
	No	9	5.8
	Yes (correct)	122	78.7
All newborns should have a hearing screening within the first month of life.	Idk	11	7.1
	No	33	21.3
	Yes (correct)	111	71.6
Screening of vision and eye examination to all newborns at 1st week to 2 months must be done.	Idk	20	12.9
	Yes	102	65.8
	No (correct)	33	21.3
Screening for cryptorchidism in the male newborn baby at the first visit	Idk	30	19.4
	No	26	16.8
	Yes (correct)	99	63.9
Screening for congenital hip dysplasia at fifth visit for all newborns.	Idk	38	24.5
	Yes	63	40.6
	No (correct)	54	34.8
Screening for congenital heart disease at 1st visit for all newborns	Idk	22	14.2
	No	40	25.8
	Yes (correct)	93	60.0
Total		155	100.0

Newborn screening knowledge for participants was 22 (14.2%) of them had good knowledge, 102(65.8%) had fair knowledge, and 31(20.0%) had poor newborn screening knowledge. According to their demographic

data, the newborn screening knowledge was significant to the age and job description, and not significant for gender, marital state, and years of experience as shown in the table (6).

Table (6): Distribution of participants doctors according to their demographic data with the newborn screening knowledge.

		Newborn screening knowledge			Total	P-value
		Poor	Fair	Good		
Total		**31**	**102**	**22**	**155**	
Age	≤29	15	21	3	39	**0.028**
	30 - 39	7	48	9	64	
	40 -49	7	20	6	33	
	≥ 50	2	13	4	19	
Gender	Male	11	19	4	34	0.125
	Female	20	83	18	121	
Marital Status	Single	10	20	4	34	0.629
	Married	21	78	18	117	
	Previous married	0	4	0	4	
Job Description	Graduated doctors	10	20	1	31	**0.005**
	Board students	9	30	7	46	
	GP	8	25	1	34	
	Specialists	4	27	13	44	
Years of experience	≥5	15	25	4	44	0.178
	6 to 10	5	26	5	36	
	11 to 15	3	22	4	29	
	16 to 20	5	10	4	19	
	>20	3	19	5	27	

Children 1st month to 59th months Screening: The response of participants' doctors regarding children 1st month to 59 months screening programs was that only 61(39.4%) knew there are children from 1month to59months screening programs in Iraq and as shown in the following table:

Table (7): Distribution of participant doctors according to their answers about children 1st month to 59th months screening programs.

		Freq	%
Do we have screening tests for Children 1st month to 59thmonths in Iraq?	Idk	44	28.4
	No	50	32.3
	Yes (correct)	61	39.3
Developmental milestones for each age group must be checked for social/emotional.	Idk	20	12.9
	No	19	12.3
	Yes (correct)	116	74.8
Developmental milestones for fifth age must be checked for language/communication.	Idk	36	23.2
	Yes	86	55.5
	No (correct)	33	21.3
Developmental milestones for each age group must be checked for cognitive (learning, thinking) but not for problem-solving	Idk	31	20.0
	Yes	81	52.3
	No (correct)	43	27.7
Developmental milestones for each age group must be checked for movement /physical development.	Idk	24	15.5
	No	10	6.4
	Yes (correct)	121	78.1
Only length/height and weight are important in developmental assessment.	Idk	4	2.6
	Yes	32	20.6
	No (correct)	119	76.8
A hearing check must be done on the 4th month, 9th month, 3rd year then at 5 years old.	Idk	42	27.1
	Yes	91	58.7
	No (correct)	22	14.2
Vision screening at the age of 4th month, 9th month, 3rd years, then at 5th years old.	Idk	41	26.5
	No	24	15.5
	Yes (correct)	90	58.0
Total		155	100.0

Children 1st month to 59th months screening programs knowledge for participants' doctors were 9 (5.8%) were good knowledge, 125(80.6%) were fair knowledge, and 21(13.5%) were with poor knowledge. According to their demographic data, the children's 1st month to 59th month screening programs knowledge was significant to years of experience and insignificant to the age, gender, marital state, and job description as shown in the table (8) below.

Table (8): Distribution of participants doctors according to their demographic data with the children 1st month to 59th months screening programs knowledge.

		Children 1st month to 59th month screening know.			Total	P-value
		Poor	Fair	Good		
Total		**21**	**125**	**9**	**155**	
Age	≤29	4	35	0	39	0.081
	30 - 39	7	51	6	64	
	40 -49	9	22	2	33	
	≥ 50	1	17	1	19	
Gender	Male	2	32	0	34	0.067
	Female	19	93	9	121	
Marital Status	Single	5	28	1	34	0.221
	Married	16	94	7	117	
	Previous married	0	3	1	4	
Job Description	Graduated doctors	3	28	0	31	0.099
	Board students	6	35	5	46	
	GP	8	26	0	34	
	Specialists	4	36	4	44	
Years of experience	≥5	6	38	0	44	**0.049**
	6 to 10	3	29	4	36	
	11 to 15	2	23	4	29	
	16 to 20	6	13	0	19	
	>20	4	22	1	27	

Preschool Screening: The response of participants' doctors regarding pre-school screening knowledge was that 116 (74.8%) of them knew there is pre-school screening done in Iraq and as shown in table (9).

Table (9): Distribution of participant doctors according to their answers about pre-school screening programs.

		Freq.	%
Do we have a preschool screening in Iraq?	Idk	19	12.3
	No	20	12.9
	Yes (correct)	116	74.8
A hearing assessment must be done to all children	Idk	9	5.8
	No	24	15.5
	Yes (correct)	122	78.7
Vision screening must be done on all children at school entry, another screen at seven years old then at 8 years old.	Idk	7	4.5
	Yes	130	83.9
	No (correct)	18	11.6
There is no blood test to be ordered.	Idk	33	21.3
	No	35	22.6
	Yes (correct)	87	56.1
Nutritional assessment is done by measuring height, weight, and BMI.	Idk	4	2.6
	No	50	32.2
	Yes (correct)	101	65.2
Psychological health assessment is done on children with a history of problems only.	Idk	15	9.7
	Yes	65	41.9
	No (correct)	75	48.4
Total		155	100.0

Pre-school screening participants' knowledge was 17(11%) were good knowledge, 111 (71.6%) were of fair knowledge, and 27(17.4%) were poor knowledge. According to their demographic data, the pre-school

screening programs' knowledge was insignificant to the age, gender, marital state, job description, and years of experience as shown in the table (10).

Table (10): Distribution of participants doctors according to their demographic data with pre-school screening programs knowledge.

		Total preschool knowledge			Total	P-value
		Poor	Fair	Good		
Total		**27**	**111**	**17**	**155**	
Age	≤29	5	33	1	39	0.071
	30 - 39	12	45	7	64	
	40 -49	7	18	8	33	
	≥ 50	3	15	1	19	
Gender	male	10	22	2	34	0.086
	female	17	89	15	121	
Marital Status	Single	10	20	4	34	0.276
	Married	21	78	18	117	
	Previous married	0	4	0	4	
Job Description	Graduated doctors	4	26	1	31	0.376
	Board students	7	35	4	46	
	GP	7	23	4	34	
	Specialists	9	27	8	44	
Years of experience	≥5	6	36	2	44	0.416
	6 to 10	6	26	4	36	
	11 to 15	8	18	3	29	
	16 to 20	4	11	4	19	
	>20	3	20	4	27	

The Premarital Screening: Regarding the premarital screening 139(89.7%) of the participants, doctors knew there is premarital screening in Iraq and as shown in table (11).

Table (11): Distribution of participant doctors according to their answers about the premarital screening program.

		Freq	%
Do we have a Premarital screening in Iraq?	Idk	7	4.5
	No	9	5.8
	Yes (correct)	139	89.7
Screening for infectious diseases (HBV, HCV, HIV, Syphilis, TB)	Idk	9	5.8
	No	20	12.9
	Yes (correct)	126	81.3
Screening for hemoglobinopathy (B-thalassemia carrier, sickle cell hemoglobin)	Idk	11	7.1
	No	42	27.1
	Yes (correct)	102	65.8
Primary and secondary sexual characteristics examination for adolescents aged less than 12 years seeking legal marriage.	Idk	40	25.8
	Yes	60	38.7
	No (correct)	55	35.5
Total		155	100.0

The premarital screening participants' knowledge was 47 (30.3%) were good knowledge, 100 (64.5%) were of fair knowledge, and 8 (5.2%) were poor knowledge. According to their demographic data, the premarital screening program knowledge was not significant to the age, gender, marital state, job description, and years of experience as shown in the table (12).

Table (12): Distribution of participants doctors according to their demographic data with premarital screening programs knowledge.

	Total premarital screening knowledge			Total	P-value
	Poor	Fair	Good		
Total	**8**	**100**	**47**	**155**	

Age	≤29	2	25	12	39	0.858
	30 - 39	2	44	18	64	
	40 -49	2	21	10	33	
	≥ 50	2	10	7	19	
Gender	male	3	23	8	34	0.394
	female	5	77	39	121	
Marital Status	Single	3	22	9	34	0.807
	Married	5	75	37	117	
	Previous married	0	3	1	4	
Job Description	Graduated doctors	2	19	10	31	0.551
	Board students	1	30	15	46	
	GP	3	25	6	34	
	Specialists	2	26	16	44	
Years of experience	≥5	3	28	13	44	0.880
	6 to 10	0	24	12	36	
	11 to 15	2	17	10	29	
	16 to 20	1	12	6	19	
	>20	2	19	6	27	

Antenatal and Postnatal Screening: Regarding antenatal and postnatal screening, 138 (89%) of doctors knew that there is antenatal screening in Iraq, while 93 (59.4%) of them knew that there is post-natal screening in Iraq, other participants' answers are shown in the table (13).

Table (13): Distribution of participant doctors according to their answers about the antenatal and postnatal screening program.

		Freq	%
Do we have an antenatal screening in Iraq?	Idk	3	1.9
	No	14	9.0
	Yes (correct)	138	89.0
Infectious diseases screening (HBV, HCV, syphilis) at the first visit is done by a blood test.	Idk	4	2.6
	No	10	6.4
	Yes (correct)	141	91.0
20 weeks scan by ultrasound for the congenital anomaly, multiple pregnancies, and gestational age.	Idk	5	3.2
	No	21	13.5
	Yes (correct)	129	83.2
Gestational diabetes screening at 24 weeks of gestation by FBS or 75g -1hour glucose challenge	Idk	6	3.9
	No	17	11.0
	Yes (correct)	132	85.1
Blood pressure checks at the first visit and if she develops a severe headache.	Idk	0	0
	Yes	107	69.0
	No (correct)	48	31.0
HIV screening during pregnancy for all risk group women (high risk or vulnerable).	Idk	10	6.5
	No	43	27.7
	Yes (correct)	102	65.8
Intimate partner violence screening of childbearing age women and pregnant women is done at each visit.	Idk	28	18.1
	No	60	38.7
	Yes (correct)	67	43.2
Hb blood test in the 1st visit then at 2nd and 3rd trimester as a screen for anemia.	Idk	4	2.6
	No	13	8.4
	Yes (correct)	138	89.0
General urine examination at each trimester.	Idk	2	1.3
	Yes	132	85.2
	No	21	13.5
Screening for depression during pregnancy in each trimester	Idk	22	14.2
	no	57	36.8
	Yes (correct)	76	49.0
A dental examination is done monthly for a pregnant woman	Idk	16	10.3
	Yes	91	58.7

	No (correct)	48	31.0
Do we have a postnatal screening in Iraq?	Idk	15	9.7
	No	48	31.0
	Yes (correct)	92	59.3
Screening for postpartum depression at 1month after delivery.	Idk	13	8.4
	Yes	99	63.9
	No (correct)	43	27.7
Screening for postpartum blues at 1st visit postpartum	Idk	18	11.6
	No	38	24.5
	Yes (correct)	99	63.9
Fasting plasma glucose test 6-13week or HbA1c test postpartum to a Mother with gestational diabetes as a screen for diabetes mellitus.	Idk	18	11.6
	No	48	31.0
	Yes (correct)	89	57.4
We offer an annual HbA1c test to mothers who have a negative postnatal test for diabetes if they had gestational diabetes this pregnancy.	Idk	25	16.2
	No	65	41.9
	Yes (correct)	65	41.9
Total		155	100.0

The participants' doctors antenatal and postnatal knowledge, 13 (8.4%) of them were good knowledge, 119 (76.8%) were fair knowledge and 23 (14.8%) were of poor knowledge. According to their demographic data, the antenatal and postnatal screening program knowledge was significant to the gender, and job description, but not significant to the age, marital state, & years of experience as shown.

Table (14): Distribution of participants doctors according to their demographic data with antenatal and postnatal screening knowledge.

		Total antenatal and postnatal screening knowledge			Total	P-value
		Poor	Fair	Good		
Total		**23**	**119**	**13**	**155**	
Age	≤29	11	26	2	39	0.161
	30 - 39	6	52	6	64	
	40 -49	4	27	2	33	
	≥ 50	2	14	3	19	
Gender	male	11	21	2	34	**0.005**
	female	12	98	11	121	
Marital Status	Single	5	27	2	34	0.791
	Married	18	88	11	117	
	Previous married	0	4	0	4	
Job Description	Graduated doctors	10	21	0	31	**0.000**
	Board students	3	38	5	46	
	GP	9	24	1	34	
	Specialists	1	36	7	44	
Years of experience	≥5	12	30	2	44	0.161
	6 to 10	1	32	3	36	
	11 to 15	5	21	3	29	
	16 to 20	3	14	2	19	
	>20	2	22	3	27	

Non - Communicable Diseases (NCD) and Cancer: Regarding non -communicable diseases (NCD) and cancer, 122 (78.7%) knew that there is NCD screening in Iraq, and also 120 (77.4%) knew that there is cancer screening in Iraq, other participants' answers are shown in the table (15).

Table (15): Distribution of participant doctors according to their answers about the NCD and cancer screening programs.

		Freq.	%
Do we have non-communicable disease screening in Iraq?	Idk	13	8.4
	No	20	12.9
	Yes (correct)	122	78.7

Hypertension screening began at age of 20 years old by measuring blood pressure with a sphygmomanometer.	Idk	7	4.5
	No	56	36.1
	Yes (correct)	92	59.4
Screening for Diabetes mellitus should begin at age of 40 and above and earlier if the patient had risk(s) for diabetes mellitus.	Idk	4	2.6
	No	17	11.0
	Yes (correct)	134	86.5
Screening for diabetes done by FBS lab test	Idk	2	1.3
	No	38	24.5
	Yes (correct)	115	74.2
Screening for cardiovascular diseases is done at the age of 20 years and above.	Idk	35	22.6
	Yes	33	21.3
	No (correct)	87	56.1
Patients with both hypertension and diabetes are not involved in the screening for CVD.	Idk	17	11.0
	No	106	68.4
	Yes (correct)	32	20.6
Pregnant women are involved in the screening for CVD.	Idk	25	16.1
	Yes	60	38.7
	No (correct)	70	45.2
Screening of CVD done by WHO-risk factors prediction chart without cholesterol measurement can be used to predict the cardiovascular disease risk over the next 10 years.	Idk	45	29.0
	No	47	30.3
	Yes (correct)	63	40.6
Screening for osteoporosis in women at age >65years and for men >70 years without risk factors or earlier if there are risk factors	Idk	25	16.13
	No	25	16.13
	Yes (correct)	105	67.74
Vision screen at age 40th years old	Idk	45	29.0
	No	46	29.7
	Yes (correct)	64	41.3
Did we have Cancer screening in Iraq?	Idk	9	5.8
	No	26	16.8
	Yes (correct)	120	77.4
Pap smear test a screen for cervical cancer begins at age of 25 to 50 years old and every 3 years	Idk	27	17.4
	No	61	39.4
	Yes (correct)	67	43.2
Women over the age of 18 may refer for co-testing a Pap smear and HPV test for cervical cancer screening.	Idk	33	21.3
	Yes	66	42.6
	No (correct)	56	36.1
Screening for breast cancer should begin at the age of 20 years old by breast self-examination.	Idk	6	3.9
	No	45	29.0
	Yes (correct)	104	67.1
Referral for Mammogram screening is done yearly at age 50 and older in women without risk factors.	Idk	9	5.8
	No	43	27.7
	Yes (correct)	103	66.5
Referral for breast ultrasound at age 20 to 39 years old to women with high risk(s) annually	Idk	15	9.7
	Yes	120	77.4
	No (correct)	20	12.9
Referral for Mammogram screening at age of 40 is done yearly in high-risk patients	Idk	10	6.5
	No	18	11.6
	Yes (correct)	127	81.9
Total		155	100.0

The participants' doctors non- communicable disease and cancer knowledge were 14 (9.1%) of them were good knowledge, 130 (83.9%) were fair knowledge and 11 (7%) were of poor knowledge. According to their demographic data, the NCD and cancer screening programs knowledge was insignificant to the age, gender, marital state, job description, and years of experience as shown in the table (16).

Table (16): Distribution of participants doctors according to their demographic data with NCD and Cancer screening knowledge.

		Non-communicable diseases and cancer screening knowledge			Total	P-value
		Poor	Fair	Good		
Total		**11**	**130**	**14**	**155**	
Age	≤29	5	32	2	39	0.371
	30 - 39	5	54	5	64	
	40 -49	0	29	4	33	
	≥ 50	1	15	3	19	
Gender	male	4	25	5	34	0.179
	female	7	105	9	121	
Marital Status	Single	0	32	2	34	0.265
	Married	11	94	12	117	
	Previous married	0	4	0	4	
Job Description	Graduated doctors	5	25	1	31	0.108
	Board students	3	38	5	46	
	GP	2	31	1	34	
	Specialists	1	36	7	44	
Years of experience	≥5	6	36	2	44	0.292
	6 to 10	0	33	3	36	
	11 to 15	3	24	2	29	
	16 to 20	1	15	3	19	
	>20	1	22	4	27	

Tuberculosis(TB) and Human Immunodeficiency Virus (HIV) screening: Regarding participants' response to Tuberculosis (TB) and HIV screening, 102 (65.8%) of them knew that there is TB screening in Iraq, and 110 (71%) of them knew that there is HIV screening in Iraq, other participants' answers are shown in the table (17).

Table (17): Distribution of participant doctors according to their answers about TB and HIV screening programs.

		Freq.	%
Did we have tuberculosis screening in Iraq?	Idk	22	14.2
	No	31	20.0
	Yes (correct)	102	65.8
All patients with cough for 2 weeks and more without response to treatment should be screened for TB.	Idk	11	7.1
	No	36	23.2
	Yes (correct)	108	69.7
Periodic screening and testing of health care workers staff for TB with adequate access to treatment.	Idk	26	16.8
	No	24	15.5
	Yes (correct)	105	67.7
TB screening should be done for active TB-contact patients.	Idk	13	8.4
	No	17	11.0
	Yes	125	80.6
TB screening is not needed to provide to all HIV-contact patients.	Idk	26	16.8
	Yes	48	31.0
	No	81	52.2
TB screening must be provided to all prisoners.	Idk	16	10.3
	No	17	11.0
	Yes (correct)	122	78.7
TB screening doesn't provide among refugees.	Idk	31	20.0
	Yes	47	30.3
	No (correct)	77	49.7
TB screening must be done on IV drug abusers.	Idk	25	16.1
	No	41	26.5
	Yes (correct)	89	57.4
TB screening is provided to all diabetic patients.	Idk	25	16.1

	No	80	51.6
	Yes (correct)	50	32.3
Do we have HIV screening in Iraq?	Idk	24	15.5
	No	21	13.5
	Yes (correct)	110	71.0
HIV test screen should be provided for all TB patients.	Idk	26	16.8
	No	29	18.7
	Yes (correct)	100	64.5
HIV screening is done on blood donors.	Idk	2	1.3
	No	7	4.5
	Yes (correct)	146	94.2
HIV screening is done for HBV and /or HCV-infected persons.	Idk	11	7.1
	No	11	7.1
	Yes (correct)	133	85.8
HIV screening is done to prostitute prisoners only but not killers.	Idk	52	33.5
	Yes	43	27.7
	No (correct)	60	38.7
HIV screening is done for all patients with dialysis.	Idk	5	3.2
	No	9	5.8
	Yes (correct)	141	91.0
HIV screening is done for all foreign workers from outside the country.	Idk	24	15.5
	No	13	8.4
	yes (correct)	118	76.1
The spouse of HIV infected person must have an HIV screen test every 3 months.	Idk	48	31.0
	No	13	8.4
	Yes (correct)	94	60.6
HIV contact person must do an HIV screen test every 12 months	Idk	54	34.8
	Yes	77	49.7
	No (correct)	24	15.5
HIV screen test are provided to persons who frequently receive a blood transfusion.	Idk	13	8.4
	No	4	2.6
	Yes (correct)	138	89.0
Total		155	100.0

The participants' doctors TB and HIV screening knowledge, 65 (41.9%) of them were good knowledge, 82 (52.9%) were fair knowledge and 8 (5.2%) were of poor knowledge. According to their demographic data, the TB and HIV screening programs knowledge was significant to the age, job description, and years of experience but insignificant to the marital state, gender as shown in the table (18).

Table (18): Distribution of participants doctors according to their demographic data with TB and HIV screening knowledge.

		Total TB and HIV screening knowledge			**Total**	**P-value**
		Poor	**Fair**	**Good**		
Total		**8**	**82**	**65**	**155**	
Age	≤29	5	29	5	39	**0.001**
	30 - 39	2	31	31	64	
	40 -49	1	16	16	33	
	≥ 50	0	6	13	19	
Gender	male	1	22	11	34	0.284
	female	7	60	54	121	
Marital Status	Single	1	22	11	34	0.384
	Married	7	59	51	117	
	Previous married	0	1	3	4	
Job Description	Graduated doctors	5	23	3	31	**0.000**
	Board students	1	24	21	46	
	GP	2	22	10	34	
	Specialists	0	13	31	44	

Years of experience	≥5	6	31	7	44	**0.000**
	6 to 10	0	18	18	36	
	11 to 15	2	12	15	29	
	16 to 20	0	12	7	19	
	>20	0	9	18	27	

Total Screening Knowledge: finally, regarding overall total screening knowledge, 16 (10.3%) of them had good total screening knowledge, 129 (83.2%) of them had fair knowledge, and 10 (6.5%) had poor knowledge. According to their demographic data, the total screening programs knowledge was significant to the age, job description, and years of experience, but insignificant to the marital state, gender as shown in the table (19).

Table (19): distribution of participants doctors according to their age, gender, marital state job description, and years of experience with total screening knowledge.

		Total screening knowledge			Total	P-value
		Poor	Fair	Good		
Total		**10**	**129**	**16**	**155**	
Age	≤29	7	31	1	39	**0.003**
	30 - 39	3	53	8	64	
	40 -49	0	31	2	33	
	≥ 50	0	14	5	19	
Gender	male	3	28	3	34	0.787
	female	7	101	13	121	
Marital Status	Single	1	30	3	34	0.728
	Married	9	95	13	117	
	Previous married	0	4	0	4	
Job Description	Graduated doctors	6	25	0	31	**0.000**
	Board students	3	39	4	46	
	GP	1	32	1	34	
	Specialists	0	33	11	44	
Years of experience	≥5	8	35	1	44	**0.004**
	6 to 10	1	29	6	36	
	11 to 15	1	24	4	29	
	16 to 20	0	19	0	19	
	>20	0	22	5	27	

CHAPTER FIVE: DISCUSSION

DISCUSSION

This study was conducted to assess the knowledge of the timing and schedule of screening programs according to Iraqi guidelines among PHCCs Physicians in Baghdad, Iraq. To the best of our knowledge, no studies have been done in this region, an insight into the knowledge among PHC level Physicians, with important secondary prevention like screening, would be a guide to effective timing and scheduling strategies.

The sample taken in the current study showed that most of the participants were in the age group of (30-39) years, this may be due to general practitioners and trainee doctors working at PHCCs as a part of their career ladder. Also, the majority of the participants were females (78.1%), married (75.5%), and most of the participants were Family medicine board students followed by specialists this may be due to most of the PHCCs that enrolled in this study being in the city and three of them were board training centers for family medicine.

Most of the participants were with years of experience of less than or equal to five, it was expected; that graduated doctors, had less than five years of experience and bored students had post-rotation enrolling in the family medicine board.

Regarding general screening knowledge: Majority of them had fair knowledge, this disagreed with Mohammed Ibrahim Alsubhi et al. in Saudia showing that nearly two-thirds of them had good knowledge, 25.2% with fair knowledge, and 4.9% had poor knowledge, and it was only significant to doctors' age.[112] This may be due to physicians' limited knowledge or skills about the concept of screening as a preventive service.

Regarding newborn screening programs: Concerning newborns screening program most of them had fair knowledge significantly associated with the age and job description that graduated doctors had less knowledge.

Regarding screening from one month to 59 months old children: Majority of the participants had fair

knowledge and was associated with years of experience that more years the better knowledge.

This was disagreed with a pilot study by Lian WB, et al. in Singapore done on GPs that (37.5%) achieved a pass rate score and (62.5%) achieved all correct answers to all questions on normal development, childhood developmental and behavioral disorders are increasingly being recognized nowadays, with the number of cases receiving diagnosis and intervention being likely only the tip of the iceberg.[113]

And it disagreed with a study in Kuwait that in general, family doctors and pediatricians practicing in public hospitals and primary health care centers in the State of Kuwait do not use or know how to use a developmental screening instrument, while over half prioritized immunization counseling over child screening.[114]

Regarding preschool screening knowledge: More than two thirds of the participants had fair knowledge. Despite that according to MOH in Iraq preschool screening and the examination report for 2020-2021, that 69% of Resafa directorate and 76% of Karkh directorate new school students were screened by PHCCs,[115] that may be because new school students' check-in is a part from school health program in the PHCCs.

Regarding the premarital screening program: Nearly two-thirds of participating doctors were of fair knowledge and 30.3% had good knowledge and 5.2% had poor knowledge. Premarital screening knowledge was not significant to the age, gender, marital state, job description, and years of experience. In a study that was done in Saudia by Zaidi Sana Sulaiman Al, et al. that 53% of the physicians demonstrated good knowledge, 23.8% exhibited fair knowledge, and 23.2% showed poor knowledge scores, and was significant to the age, marital status, job title, and years of experience.[116]

Antenatal and postnatal screening knowledge: majority of them had fair knowledge, which was significant to the gender, this due to the antenatal and postnatal programs always occupied by female doctors due to cultural issues, and job description due to specialist had more training courses than joiner doctors; but insignificant to the marital state, age, and years of experience.

This agreed with a study done by Kristie Rostant, et al. in Australia on GPs and obstetricians about Prenatal screening and diagnosis found that they had good overall knowledge and a Female health care providers were significantly more confident about the availability of follow-up services and had higher knowledge scores.[117]

And, this disagreed with Al-Dor S, et al. in their study done in Jeddah that knowledge of PHCCs doctors about screening of postpartum depression, 28.2% had low knowledge, 40.9% had fair knowledge and 30.9% had good knowledge and disagree regarding significance to the age and not significant to gender and agreed with our study that was significant to the job title. PPD Screening is important because the majority of mothers did not seek medical help for mental conditions such as depression and anxiety.[58] In order that good knowledge of PHCCs physicians provide good ANC and PNC services.

In another study in Morocco by Bettina Utz et al. done on PHCCs doctors, nurses, and midwives health care providers who informed about re-testing for diabetes, 89.4% indicated they re-test women who had GDM post-partum and this disagreed with our study that only 57.4% knew about the timing of re-testing for diabetes.[57]

Non-communicable diseases and Cancer: Most of the participants had fair to good knowledge. this disagreed with a study done by Al-Khashman AS in Saudia Arabia that PHCCs doctors that only 56% of doctors would screen the patient at the screening schedule of Saudia Arabia.[67]

And disagree with another study by Ayman S. Abdelhady in Egypt that the participating physicians had poor knowledge of some important items of hypertension, and the practices of PHCCs doctors towards screening patients for hypertension, showed that only 46.2% routinely screen patients.[68] This is because non-communicable diseases account for 55% of all deaths in Iraq, in response to the high NCD burden; WHO in collaboration with the Ministry of Health, has identified the prevention and control of NCDs as a priority area of work.[61]

Also, this study disagreed with a study by Shaheen NA, Alaskar A., et al. in Saudia that only 43% of physicians had answered correctly the required age of DM screening (86.5% in this study) and 100% of the physicians responded correctly to mammogram timing of screening (in this study 66.5% and 81.9% of two questions) but agreed with the same study that 49% of physicians responded correctly to cervical cancer screening timing (43.2% in this study),[73] this due to mammogram machine is screening tool for breast cancer diagnosis and are limited and used only for diagnostic purposes because they are cost effective and found only in the main hospital of each governorate so that clinical examination is cost effective in PHCCs.

Another study by Faten A. et al. in Cairo found that there is a lack of knowledge about guidelines and recommendation for breast cancer screening was higher among junior doctors (as the study was comparative between the senior and junior PHCCs doctors) this disagreed with our study that it was not significant to the age or job description and years of experience.[89]

TB and HIV screening knowledge: Good to fair knowledge was found in most of them, and it was

significant to age, job description fewer scores and the and years of experience.

In a survey was done in Canada about the knowledge of family physicians about TB prevention, the result was most of the physicians had moderate knowledge regarding the who needs to screen for TB with a mean score of 71%, a slightly lower percentage(42%,60%) recognize that HIV/AIDS patients should have the screening test (64.5% answer correctly in this study), and only 16% acknowledge that patient with chronic diseases should have a screening test such as diabetic patients (32.3% answered correctly in this study).[101]

Another study by Sara Bares et al. in the USA that half of the participants knew details of the HIV screening guidelines, but few follow the recommendations. Less than one-third reported always or usually performing routine testing, although this study was done on resident doctors only, it agreed with our study.[118]

Concerning the overall doctors' knowledge: Majority of physicians had fair knowledge, and it was significantly associated with age, job description, and years of experience, this may be due to fewer years of experience and lack training courses regarding screening programs. And this disagreed with a study done in Saudia that displayed poor knowledge of healthcare professionals about the screening guidelines,[73] this may be due to their study conducted in tertiary centers and done on doctors, nurses, and pharmacists.

CHAPTER SIX: CONCLUSION AND RECOMMENDATION

CONCLUSION

1. The study found that all of the participants had fair specific total knowledge about the timing and schedules of screening programs.
2. The age, gender, marital state, job description, and years of experience were not statistically significant influence on the level of knowledge regarding general screening knowledge, the preschool screening, the premarital, and the NCD and cancer.
3. Regarding newborn screening: Better knowledge was accomplished by age group of 30 - 39 years old and most of them are specialists with years of experience of 6 -10 years, the doctors' gender and marital status did not illustrate the statistically significant influence on the level of knowledge. The highest percentage of participants had poor knowledge regarding total screening knowledge that are of age less or equal to 29 and are graduated doctors.
4. Regarding children 1st month to 59th month: better knowledge was accomplished by years of experience 6-10years and 11 to 15 years.
5. Regarding ANC and PNC screening: females had better knowledge than males and are specialists.
6. Regarding TB and HIV screening and total screening knowledge: Better knowledge was accomplished by age group of 30 - 39 years old and most of them are specialists with years of experience of 6 -10 years, the doctors' gender and marital status did not illustrate the statistically significant influence on the level of knowledge. The highest percentage of participants had poor knowledge regarding total screening knowledge that are of age less or equal to 29 and are trainee doctors.

RECOMMENDATION

1. Encouraging having more training programs to be planned especially regarding the concept of preventive medicine and screenings to enhance the awareness & knowledge of screening programs among PHCCs Physicians.
2. Conducting further studies on larger samples of PHCCs across Iraq with the goal of increasing their knowledge.
3. Provide screening guidelines to the primary healthcare centers, and make them easily accessible to the doctors.

Limitation of The Study

1. Limited access to Iraqi guidelines regarding screening programs to formulate the questionnaire.
2. It wasn't easy to get a Request for the facilitation of a researcher's mission and the time available for data collection was limited to only two months.
3. Some doctors (6.6%) refuse to be involved in the research due to either being busy or not interested or tired from work.

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Appendix 1: primary healthcare centers included in the study and pilot study

AL Zahraa AL-Namootheji training healthcare center.
Hey AL-Salam Al-Sakany training healthcare center
AL Kadhumia 1 primary healthcare center
ALHurya 1 primary healthcare center
ALDora primary healthcare center
Al Jameiatprimary healthcare center
Al Adel health center of family medicine
ALShabab AL-Namouthaji for family medicine
Al-Mansour AL-Namootheji training healthcare center
Abu Ghraib primary healthcare center
Al-Zaytoonprimary healthcare center
Al-Taji Beach primary healthcare center
Al-Taji 1 primary healthcare center
Shuhdaa Al-Atatyfiaprimary healthcare center
ALJamiaa health center for family medicine
Bab ALMuadhumprimary healthcare center
LMustansirya training healthcare center
Adhamiya 1 primary healthcare center
Al-Sadr7 primary healthcare center
Al-Sadr 2 primary healthcare center
Al Dhalik primary healthcare center
Suliman Al-Fadhiprimary healthcare center
Al-NahrawanAlNamothaji healthcare center
Al-Nahrawan 1 primary healthcare center
Al Baladiat 1 primary healthcare center
Al-Mualmeen primary healthcare center
Al-Dhubat Al-Namothaji training healthcare center
Dawood Al-Janabiprimary healthcare center
Al Obaidi primary healthcare center
Al-Naser primary healthcare center

Appendix 2: The Questionnaire

Knowledge of PHCCs-Doctors About schedule and timing of Screening Tests and examinations done in Iraq: Sample from Baghdad.

Dear doctor this questionnaire is designed for research purposes only, any information will be top-secret, and will be seen by the researchers only, you are free to involve in the research or not, but its benefits will help you and others in the future, the time for complete it not more than 10 mints. With thank

1. PHCC name and the sector:
2. Age:---------- years
3. Sex: - Male □, Female□.
4. Marital status: Single □, Married □, Divorced □, Widow □
5. Job description: trainee doctors O, board students O, GP O, specialist O
6. Years of experience: ≥ 5 O, 6-10 O, 11-15 O, 16-20 O, > 20 O
7. Did you have a training course about screening programs: Yes O, No O
8. Are screening guidelines available in your PHCC? Yes O, No O
9. If yes: Do you easily access these guidelines? Yes, for all O, No for all O, Yes, few of them O.
10. Please answer with (yes) if it is right and (no) if it is wrong or (don't know):

(Note: IDK= I don't know)

	Screening in general	**Yes**	**No**	**IDK**
1.	Screening refers to the application of a medical procedure or test to people who as yet have no symptoms of a particular disease, to determine their likelihood of having the disease.			
2.	The screening procedure is used for diagnosing the illness.			
3.	Screening tests were done at regular intervals like once a year or once in two to three years, or when a person reaches a certain age.			
	Newborns screening tests:	**Yes**	**No**	**IDK**
4.	Did we have Newborn screening tests in Iraq?			
5.	Newborn blood spot heel prick test must be done at 3 to 5 days of life to 30 days of life			

6.	All newborns should have a hearing screening within the first month of life			
7.	Screening of vision and eye examination to all newborns at 1st week to 2 months must be done.			
8.	Screening for cryptorchidism in a male newborn baby at the first visit			
9.	Screening for congenital hip dysplasia at fifth visit for all newborns.			
10.	Screening for congenital heart disease at 1st visit for all newborns			
	Children 1st month to 59 months	**Yes**	**No**	**IDK**
11.	Did we have screening tests for Children 1st month to 59th months in Iraq?			
12.	Developmental milestones for each age group must be checked for social/emotional.			
13.	Developmental milestones for the fifth visit must be checked for language/communication.			
14.	Developmental milestones for each age group must be checked for cognitive (learning,thinking) but not for problem-solving.			
15.	Developmental milestones for each age group must be checked for movement /physical development.			
16.	Only length/height and weight are important in developmental assessment			
17.	Hearing check must be done at 4th month, 9th month and 3rd year than at 5th years old.			
18.	Vision screening at age of 4th month, 9th month, 3rd years than at 5th years old.			
	Preschool screen	**Yes**	**No**	**IDK**
19.	Did we have a preschool screening in Iraq?			
20.	hearing assessment must be done on all children			
21.	Vision screening must be done to all children at school entry, another screen at 7 years old then 8 years old.			
22.	there is no blood test to be ordered			
23.	nutritional assessment is done by measuring height, weight, BMI only			
24.	Psychological health assessment is done on children with a history of problems only.			
	Premarital screening	**Yes**	**No**	**IDK**
25.	Did we have a Premarital screening in Iraq?			
26.	Screening for infectious diseases (TB, HBV, HCV, HIV, Syphilis)			
27.	Screening for hemoglobinopathy (B-thalassemia carrier, sickle cell hemoglobin)			
28.	Primary and secondary sexual characteristics examination for adolescents age less than 12 years seeking legal marriage.			
	Antenatal screening	**Yes**	**No**	**IDK**
29.	Did we have an antenatal screening in Iraq?			
30.	Infectious diseases screening (HBV, HCV, syphilis) at first visit done by a blood test.			
31.	20 weeks scan by ultrasound for the congenital anomaly, multiple pregnancies, gestational age.			
32.	Gestational diabetes screening at 24 weeks of gestation by FBS or 75g -1hour glucose challenge.			
33.	Blood pressure checks at the first visit and if she develops a severe headache.			
34.	HIV screening during pregnancy for all risk group women (high risk or vulnerable).			
35.	Intimate partner violence screening of childbearing age women and pregnant women is done at each visit.			
36.	Hb blood test in the 1st visit then at 2nd and 3rd-trimester screen for anemia.			
37.	General urine examination at each trimester.			
38.	Screening for depression during pregnancy at each trimester			
39.	The dental examination did monthly for a pregnant woman			
	Post-natal screening	**Yes**	**No**	**IDK**
40.	Do we have postnatal screening?			
41.	Screening for postpartum depression at 1month after delivery			
42.	Screening for postpartum blues at 1st visit postpartum			
43.	fasting plasma glucose test 6-13week or HbA1c test postpartum to a Mother with gestational diabetes as a screen for diabetes mellitus.			
44.	We offer an annual HbA1c test to mothers who have a negative postnatal test for diabetes if they had gestational diabetes this pregnancy.			
	Cancer screening programs	**Yes**	**No**	**IDK**
45.	Did we have Cancer screening in Iraq?			
46.	Pap smear test a screen for cervical cancer begins at age of 25 to 50 years old and every 3 years.			
47.	Women over age 18 may be referred for co-testing Pap smear and HPV test for cervical cancer screening.			
48.	Screening for breast cancer should begin at age 20 years old by breast self-examination.			

49.	Referral for Mammogram screening at age 30 years is done every 2 years in women without the risk factor.			
50.	Referral for Mammogram screening is done yearly at age 50 and older in women without the risk factor.			
51.	Referral for breast ultrasound at age 20 to 39 years old to women with high risk(s) annually			
52.	Referral for Mammogram screening at age of 40 is done yearly in the high-risk patient.			
	Screening of non-communicable disease	**Yes**	**No**	**IDK**
53.	Did we have non-communicable disease screening in Iraq?			
54.	Hypertension screening began at age of 20 years old by measuring blood pressure by sphygmomanometer.			
55.	Screening for Diabetes mellitus should begin at age of 40 and above and earlier if the patient had risk(s) for diabetes mellitus			
56.	Screening for diabetes done by FBS lab test			
57.	Screening for cardiovascular diseases is done for age 20 years and above.			
58.	Patients with both hypertension and diabetes are not involved in the screening of CVD			
59.	Pregnant women are involved in the screening of CVD			
60.	Screening of CVD done by WHO-risk factors prediction chart without cholesterol measurement can be used to predict the cardiovascular disease risk over the next 10 years.			
61.	Screening for osteoporosis in women at age >65years and men >70 years without risk factor or earlier if there are risk factors			
62.	Vision screen at age 40^{th} years old			
	TB screen	**Yes**	**No**	**IDK**
63.	Did we have tuberculosis screening in Iraq?			
64.	All patients with cough for 2 weeks and more without responding to treatment should be screened for TB			
65.	Periodic screening and testing of health care workers staff for TB with adequate access to treatment			
66.	TB screening should be done to active TB-contact patient			
67.	TB screening is not needed to provide to all HIV-contact patient			
68.	TB screening must be provided to all prisoners.			
69.	TB screening doesn't provide among refugees.			
70.	TB screening must be done on IV drugs abusers.			
71.	TB screening is provided to all diabetic patients.			
	HIV screening	**Yes**	**No**	**IDK**
72.	Do we have HIV screening in Iraq?			
73.	HIV test screen should be provided for all TB patients			
74.	HIV screening is done on blood donors			
75.	HIV screening is done to HBV and /or HCV infected persons			
76.	HIV screening is done to prostitute prisoners only but not killers			
77.	HIV screening is done on all patients with dialysis			
78.	HIV screening is done on all foreign workers from outside the country.			
79.	The spouse of HIV infected person must have an HIV screen test every 3 months.			
80.	HIV contact person must do HIV screen test every 12 months			
81.	HIV screen test provided to persons who frequently receive a blood transfusion.			

Thank you for your precious time

Appendix 3: The Ethical Approval of Baghdad Health Directorates.

وزارة الصحة / البيئة
دائرة صحة بغداد الكرخ
مركز التدريب والتنمية البشرية
لجنة البحوث

استمارة رقم ٢٠٢١/٠٣

رقم القرار:
تاريخ القرار: ٢٠٢٢/

قرار لجنة البحوث

درست لجنة البحوث في دائرة صحة بغداد / الكرخ مشروع البحث ذي الرقم (٢٠٢٢٠٨٥ / بغداد - الكرخ)
المعنون:

Knowledge of PHC-Doctors about timing and schedule of screening tests and examinations done in Iraq: Sample from Baghdad

والمقدم من قبل الباحثة (فاطمة الزهراء منصور حسين) إلى وحدة إدارة البحوث في مركز التدريب والتنمية البشرية في دائرة صحة بغداد / الكرخ بتاريخ ٢٠٢٢/٢/٧ وقررت اللجنة:

قبول مشروع البحث أعلاه كونه مستوفياً للمعايير المعتمدة في وزارة الصحة / البيئة والخاصة بتنفيذ البحوث ولا مانع من تنفيذه في قطاع الكاظمية للرعاية الصحية الاولية / قطاع العدل للرعاية الصحية الاولية / قطاع الكرخ للرعاية الصحية الاولية / قطاع التاجي للرعاية الصحية الاولية / قطاع الاعلام للرعاية الصحية الاولية / قطاع الدورة للرعاية الصحية الاولية / قطاع ابي غريب للرعاية الصحية الاولية.

الطبيب الاختصاص
سعد كامل رحيم
المدير العام/ وكالة
رئيس لجنة البحوث
٢٠٢٢/ ٢ /١٠

الدكتور
معاون المدير العام للشؤون الادارية

جمهورية العراق
محافظة بغداد
دائرة صحة بغداد / الرصافة
مركز التدريب والتنمية البشرية
العدد: ٤٣٦٧
التاريخ : ١٠/ ٤ / ٢٠٢٢

Baghdad Governorate

خدمة بغداد شرف لنا

إلى/ قطاع الرعاية الصحية الأولية في الرصافة
/ قطاع الرعاية الصحية الأولية في الاعظمية
/ قطاع الرعاية الصحية الأولية في الشعب
/ قطاع الرعاية الصحية الأولية في بغداد الجديدة
/ قطاع الرعاية الصحية الأولية في مدينة الصدر
/ قطاع الرعاية الصحية الأولية في البلديات الأول
/ قطاع الرعاية الصحية الأولية في النهروان
م/ تسهيل مهمة

تحية طيبة :-

كتاب وزارة الصحة /البيئة /المجلس العربي للاختصاصات الصحية في العراق /المكتب التنفيذي المرقم ١٤٥ في ٢٠٢٢/١/٢٣، يرجى تسهيل مهمة الطبيبة المتدربة (**فاطمة الزهراء منصور حسين**) طالبة المجلس العلمي لاختصاص طب الأسرة دورة ٢٠١٩ لغرض إجراء بحثها الموسوم : (**معارف الأطباء في المراكز الصحية الأولية حول الجدول الزمني ووقت إجراء فحوصات واختبارات التحري المجراة في العراق** عينة من أطباء بغداد)، لاتخاذ ما يلزم لتسهيل مهمتها وتزويدها بما يلزم وحسب الضوابط وسياقات العمل وان لا تتحمل وزارة الصحة أية تبعات مالية للتفضل بالإطلاع وأجراء اللازم.

... مع التقدير ...

د. الدكتور
علاء كاظم صالح
ع/المدير العام
٢٠٢٢/٤/١٠

محافظة بغداد
دائرة صحة بغداد / الرصافة

نسخة منه إلى:
- مركز التدريب والتنمية البشرية / شعبة إدارة البحوث و المعرفة / وحدة إدارة البحوث/ اضبارة تسهيل مهمة.
* حسب كتاب وزارة الصحة /البيئة /دائرة التخطيط وتنمية الموارد/قسم التخطيط المالي المرقم٦٠٦٢١ في ٢٠٢١/١٠/١٣ الفقرة (٢) المتضمن عدم استيفاء أجور كتاب تسهيل مهمة كون الموما إليها طالبة دراسات عليا و منتسبة في وزارة الصحة حسب الأمر الإداري المرقم ١٨٥٧٩ بتاريخ ٢٠١٩/١٠/٢٠.

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