

Knowledge of primary health care providers in Baghdad regarding neonatal screening program

Sabah Noori Al-Khazraji¹, Ban Juma Abed², Vian Alaa Al-Mayyahi³, Layth Al-Salihi¹

¹ MBChB, FIBMS-Paed.
MoH, Iraq.

² MBChB, FIBMS-FM, MoH,
Iraq.

³ MBChB, CABMS-FM,
MoH, Iraq.

⁴ MBChB, FIBMS-CM, MoH,
Iraq.

Corresponding Author:

Layth Al-Salihi,
Directorate of Public Health,
MoH, Iraq.
e mail: laythalsalihi@yahoo.
com
Moble: + 964 7902724613

ABSTRACT

INTRODUCTION: Newborn babies might be involved with many congenital conditions. The conditions have bad consequences on the child health or survival. Early detection and diagnosis with early proper interventions can prevent death or disability. This can be done through screening programmes. Iraq started screening for three inborn error of metabolism. Health care providers who are working in the primary health cares are the first line contact with parents and their knowledge about these conditions is very important for educating and promoting parents.

OBJECTIVE: Assessing knowledge of primary health care providers in Baghdad regarding neonatal screening program for inborn error of metabolism.

METHODS: This is a cross-sectional study assessing the knowledge of health care providers at the level of Primary Health Care centres in Baghdad regarding neonatal screening program for inborn error of metabolism through direct interviews with all related physicians and laboratory workers. Data collected through direct interviews with eligible individuals after obtaining informed verbal consents for participation. A score for the knowledge of inborn error of metabolism screening was developed.

RESULTS: This study enrolled 300 health care providers. Physicians were 183 and constituted 61% of the sample and the remaining 117 participants (39%) were laboratory technicians. Forty one of physicians (22.4%) and 58 (49.6%) of lab technicians were trained on this screening program. Majority (85%) of participants have fair knowledge this screening regarding targeted diseases and its technical considerations.

CONCLUSION: Health care providers at primary health care centres responsible for implementing neonatal screening program have fair knowledge of this program.

Key words: Inborn error of metabolism, Baghdad, Knowledge assessment,

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INTRODUCTION

Newborn screening identifies conditions that can affect a child's long-term health or survival. Early detection, diagnosis, and intervention can prevent death or disability and enable children to reach their full potential.¹ The goal of newborn screening is early identification of babies with a high risk for disorders that may not be clinically evident at birth, but have severe consequences if untreated.² The World Health Organization "WHO" defines newborn screening as a public health program, aimed at an early identification of conditions, for which early and timely interventions can lead to the

elimination or reduction of associated mortality, morbidity, and disabilities. The diseases included in a screening program do not manifest at birth and have a window period of a few days to months. This gives an opportunity to detect the condition by performing a screening test, which if positive need to be confirmed by a diagnostic test, and to initiate treatment at the pre-clinical stage thereby achieving the best possible outcome.³ The investment in screening will certainly be rewarded many times over in terms of money spent over the care of handicapped children, improved quality of life, and reducing the high burden of genetic disease.³

Newborn screening tests look for developmental, genetic, and metabolic disorders in the newborn baby. This allows steps to be taken before symptoms develop. Most of these illnesses are very rare, but can be treated if caught early.⁴

In recent times, advances in laboratory technology such as tandem mass spectrometry (MS/MS), which is more specific, sensitive, reliable, and comprehensive than traditional assays, has increased the number of genetic conditions that can be diagnosed through neonatal screening programs at birth. With a single dried filter paper blood spot, MS/MS can identify more than 30 inherited metabolic disorders in around two to three minutes.⁵

In the Gulf region, Qatar has already been running a full newborn screening program since 2004. Until recently, Saudi Arabia had a program covering only 25% of all newborns through selected hospitals; however, the Ministry of Health has recently given the permission to launch a nationwide screening program. United Arab Emirates (UAE) has also expanded its screening program in 2010.³

Iraq started screening for three inborn errors of metabolism which are congenital hypothyroidism, galactosemia, and phenylketonuria (PKU) as a pilot since 2013 under the name neonatal screening program for inborn errors of metabolism (IEM). Health staff working in this field is the people who receive parents' reflexes and attitudes towards this screening program and are the first to encounter parents and have the opportunity to educate, promote, and contain anxious parents to obtain optimal response and hence program effectiveness.

Aim of the study: Assessing knowledge of primary health care providers in Baghdad regarding neonatal screening program for IEM.

METHODS

Study design and setting: This is a cross-sectional study, assessing knowledge of health care providers working at primary health care centres (PHCCs) in Baghdad regarding neonatal screening program for IEM through direct interviews with physicians and laboratory (lab) workers. Data collection was carried out at all PHCCs (40 PHCCs) that carried out the piloting phase of implementing this program in both sides of Baghdad Governorate; Karkh and Rasafa from January 30th 2014 to May 31st 2014.

Selection of sample: Interviewees were all medical practitioners and lab workers who work in the included PHCCs during the period of data collection (comprehensive sampling). Those with long leaves were excluded from enrolment in this study.

Questionnaire preparation: A questionnaire form was prepared by the author. It included two parts, the first part included some demographic features of the sample while the second part included questions designed to assess knowledge of the interviewees related to neonatal screening programme for IEM.

Procedure: Data collected through direct structured interviews with eligible individuals after obtaining an informed verbal consent for participation. The study questionnaire collected data regarding personal characteristics and responses to questions related to knowledge about neonatal screening programme for IEM.

Statistical analysis: Package for social sciences version 20 (SPSS 20) was used for data input and analysis. Continuous variables presented as means and discrete variables presented as numbers and percentages. A score for the knowledge of IEM screening was developed with a maximum expected knowledge score of 30. Analysis of Variance (ANOVA) and t test for two independent samples were used to test the significant of difference in mean scores. Findings with P value less than 0.05 were considered significant.

Ethical considerations: Approvals of the study proposal were obtained from the scientific committee in the Council of Arab Board for Health Specialization and from the ethical committee at Ministry of Health in Iraq. Data were anonymous and confidentiality was assured and verbal consent was obtained as a condition for enrolment.

RESULTS

This study enrolled 300 health care providers. Age of participants varied from 22 to 63 years with a mean age of 40.5±9.2 year. Male to female ratio was 1:2. Physicians were 183 and constituted 61% of the sample and the remaining were lab technicians. Ninety nine (33%) of participants were trained on this screening program (table 1).

Majority of participants have knowledge correctly met the following: Neonatal screen-

Table 1: Characteristics of study sample and related mean knowledge score

Variable	Category	N (300)	%	Mean	SD	P value
Age (y)	20-29	37	12.3	21.8	3.9	0.345
	30-39	108	36.0	21.6	5.1	
	40-49	92	30.7	23.0	5.2	
	50-59	58	19.3	22.0	4.9	
	≥ 60	5	1.7	22.0	3.7	
Sex	Male	105	35.0	21.7	5.0	0.241
	Female	195	65.0	22.4	4.9	
Occupation	Physician	183	61.0	20.5	5.2	< 0.001
	Lab Technician	117	39.0	24.7	3.2	
Trained on IEM screening	Yes	99	33.0	25.5	3.2	< 0.001
	No	201	67.0	20.5	4.8	
Physician	Trained	41/183	22.4	25.0	4.0	< 0.001
	Not trained	142/183	77.6	19.2	4.8	
Laboratory workers	Trained	58/117	49.6	25.9	2.4	< 0.001
	Not trained	59/117	50.4	23.5	3.4	

Table 2: Distribution of correct knowledge responses of participants regarding techniques related to neonatal screening

Question	Correct Response	N (300)	%
Type of sample used for screening	Blood	299	99.7
Site for taking blood sample	Heel	297	99.0
Site of the heel for taking blood sample	Sides	108	36.0
Blood sampling is with	Prick	266	88.7
Is it needed to sterilize hand and wear gloves for sampling	Yes	294	98.0
Sterilizer for heel is	Alcohol	254	84.7
Need to sterilize the site of taking sample	Yes	270	90.0
Need to warm the site of taking sample	Yes	198	66.0
Squeeze to have blood sample	No	141	47.0
Not to squeeze because	Affects results	92	30.6
Where to contain the blood sample	Filter paper	203	67.7
Time to have dried sample	3 hours	142	47.3
Temperature of saving samples before transportation	Refrigerator temperature	159	53.0

ing is obligatory for all newborns by 259 (86%), candidates for screening should be of ages ≤ 2 months by 202 (76.3%), the three targeted IEM diseases- hypothyroidism (275, 92%), PKU (271, 90.3%) and Galactosemia (256, 85%), treatment is available for targeted diseases (217, 72.3%), but only 151 (50.3%) knew this screening is aimed at decreasing mental and physical disability due to targeted diseases. (Table 2)

Regarding technical considerations, majority (≥85%) has a correct knowledge regarding the followings: sample for this screening is blood, taken from the heel, with a prick by a manual lancet, sterilization of the pricking site

with alcohol. (Table 2)

Two thirds (203, 67.7%) of participants correctly knew that blood samples are contained in filter paper. Around half the sample (142, 47.3%) correctly identified the time required to have dried samples. Only 108 (36%) knew the sites for pricking the heel are its sides, and 92 (30.6%) correctly mentioned that squeezing the heel will affect results. (Table 2)

Most of participants (282, 94%) was agreeing to continue implementing this program and none of participants agreed that this program causes unjustified harm to babies.

Mean knowledge score was 22.1 ± 5.0 . Score was significantly higher in lab workers than in physicians and in trained personnel compared to non-trained personnel ($P < 0.05$, **table 1**) the proportion of trained physicians (22.4%) is much lower than the proportion of trained lab technicians (49.6%) (**table 1**). Age and sex did not show a significant influence upon knowledge score according to this study ($P > 0.05$, **table 1**).

DISCUSSION

This study showed that surveyed health care providers are fairly knowledgeable of neonatal screening program, though only one third of them were officially trained on this program. Davis TC et al⁶ has stated that everyone work in this program should take proper information and training.

Health care providers' knowledge of this program is important so as to correctly guide the attitude of parents towards complying with doing this test. More information and education to the parents and even the society about the program seems to be effective in this case; Detmar⁷ has showed that parents would prefer for more information about the program to be given during pregnancy in addition, they preferred an outpatient consent approach on condition that screening was for the purpose of preventing irreversible harm.

Most of participants will convince non-complying parents to do the test and this finding goes in line with UK⁸ and Australian⁹ guidelines which emphasize enabling parents to make an informed decisions and maintain the high level of uptake of screening.

Araia¹⁰ found that promoting mothers' understanding and meeting their expectations with respect to education about newborn blood-spot screening calls for a greater emphasis on communicating with mothers about how blood samples are handled and about the meaning of the test results. Tluczek¹¹ stated that parents suggested that providers take time to explain the purpose and importance of NBS, which diseases are included in testing, and when parents can expect results. Burlina¹² stated that paediatricians may need additional training to allow them to fulfil their tasks of coordinating this process while keeping families informed and reassured.

This study also showed that manual lancets

are used to prick and get blood sample (according to this program guidelines in Iraq) and this way is not described by other developed countries guidelines, as for the UK⁸ and the Canadian⁹ guidelines in which they advice to obtain the sample using an automated incision device designed for use on newborns (devices reduce pain and bruising, allow users to obtain the sample more quickly and reduce the risk of accidental injury from manual lancets).¹³

This study also showed that alcohol is used in this program in Iraq to sterilize the heel. This is consistent with AUSTRALIAN guidelines⁹ but not with UK guidelines⁸ because in UK they advice not to use alcohol or alcohol wipes. The use of alcohol for skin preparation in neonates and premature infants can cause burns and blisters.¹⁴

Most of sampled health care providers agreed to continue implementing this program. Acharya¹⁵ stated that most physicians support diagnostic genetic testing of high-risk children and willingness to expand newborn screening does not correlate with professional characteristics but rather with personal interest in testing of their own children, and Hiraki¹⁶ stated that professionals' attitudes towards newborn screening were not influenced by year of graduation or professional experience.

This study found that PHCCs health providers' knowledge level is fair and is influenced by training. The training was more prevalent among lab technicians which made lab technicians knowledge score higher than that of physicians.

CONCLUSIONS

Health care providers at primary health care centres responsible for implementing neonatal screening program have fair knowledge of this program.

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Abbreviation list: Analysis of Variance (ANOVA), Inborn Errors of Metabolism (IEM), Laboratory (Lab), Tandem Mass Spectrometry (MS/MS), Phenylketonuria (PKU), Primary Health Care Centers (PHCCS), Statistical Package for Social Sciences (SPSS), United Arab Emirates (UAE), World Health Organization (WHO).

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