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Assessment of factors related to caregivers and children on the IMCI program outcomes in Baghdad City in 2021

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Abstract

Background: The implementation of the Integrated Management of Childhood Illness (IMCI) program has led to enhancement in outcomes for many treatable childhood diseases. This study aims to assess how implementing IMCI affects child mortality and morbidity in Iraq.

Methods: A cross-sectional study spanning from January to December 2021 was carried out at primary healthcare centers (PHCCs) with IMCI units in Baghdad, Iraq. Using a lottery sampling method, 40 PHCCs were randomly chosen from a total of 235 centers across both sides of the city. A universal sampling technique was adopted to select all children attending these PHCCs regularly. With a p-value below 5%, multiple logistic regression analyses were performed to identify the significant independent predictors at a 95% confidence interval.

Results: The majority of caregivers were mothers (97.8%), aged 20 to 30 years (75.8%), and housewives (59.2%). Sixty percent of children (6 to 35 months) had normal anthropometric measurements. Bottle feeding was common (44.2%), and most children had a normal neonatal history (82.9%). In bivariate analysis, the severity of illness, severe cases of diarrhea, and acute respiratory infection (ARI) showed significant associations with worsened or not improved outcomes ($\chi2 = 18.900$, $p < 0.001$; $\chi2 = 6.265$, $p= 0.016$; and $\chi2 = 7.549$, $p= 0.003$, respectively). However, multiple logistic regression analysis indicated that mild and moderate illness severity (OR = 10.634, 95% CI: 6.985 to 16.192, $p < 0.001$), strict breastfeeding (OR = 3.307, 95% CI: 1.703 to 6.421, $p < 0.001$), and completing treatment at home (OR = 6.190, 95% CI: 4.115 to 9.311, $p < 0.001$) significantly improved outcomes through IMCI services.

Conclusion: Severe illness, especially in diarrhea and ARI, correlates with poorer outcomes. Conversely, exclusive breastfeeding, prompt medical attention within a day of illness onset, and completing home treatment are associated with improved outcomes.

Keywords: IMCI, IMNCI, IMNCH, Child Morbidity, PHC, Iraq

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Background

The Integrated Management of Childhood Illness (IMCI) initiative was created by the World Health Organization (WHO) in 1995 to aid health workers in the classification and management of common childhood illnesses in regions with low resources [1,2]. The guidelines produced within this initiative have been adapted to the local context by most countries in the Eastern Mediterranean region. Evaluation of the adoption of these guidelines in different countries, the potential strength of the impact of the adoption of these guidelines, and factors contributing to its effectiveness and the main factors limiting its effectiveness are essential for an understanding of how the implementation of these guidelines can progress [2]. Historically, the IMCI program in Iraq was officially launched in 1998 [3]. A noticeable increase in the number of governorates that adopted the program, the number of IMCI units opened in the primary healthcare centers, the number of IMCI training courses, and the number of trainers. However, stumbling in implementation was a prominent feature [3,4].

A few local studies have paid attention to evaluating the program during the past two decades compared to the strategic importance of its implementation. The first national evaluation of IMCI was conducted by Tawfeeq [5] in 2009. The author found a significant improvement in addressing various indicators in IMCI facilities compared to the control group. In a study conducted in 2014 in Salah ad-Din primary health care (PHC) centers where districts, doctors, and healthcare providers'

knowledge were assessed. The findings revealed significantly better knowledge retention among trained personnel compared to those who were untrained [6]. The results of a study conducted in 2016 confirmed the skills of case management, especially in assessing a child's disease. The study indicated that there is a positive relationship between the number of training courses attended by trained service providers and the level of performance [7]. The study conducted in Mosul in 2014 discovered the effectiveness of IMCI protocols in the noticeable increase in vaccination rates and reduced antibiotic recipes that are not suitable for children treated at the center [8]. However, not all studies in Iraq have resulted in encouraging results. Researchers at the Al Kindy Faculty of Medicine, the University of Baghdad in 2018, were able to determine the shortcomings among healthcare workers who commit to the instructions of IMCI, especially regarding follow-up specifications, anemia classification, and evaluation of the nutritional condition for children [9]. A study conducted in Babel Governorate in 2020 recommended intensive training of healthcare workers due to their low level of knowledge and their inconsistent commitment to IMCI protocol [10]. Another study conducted in the city of Baquba, the center of Diyala Governorate, found that 78.4 % of health care providers received training on the IMCI program, however, their performance was not encouraging, as nearly a third of them examined temperatures and seventy percent of them conducted weight evaluation of children [11]. The latest Iraqi study, which was conducted in the city of Amara in Maysan Governorate in 2021, concluded that although healthcare workers have a moderate level of knowledge, there was no statistically significant relationship between the nursing properties specified in IMCI guidelines and their general knowledge [12]. This study aims to assess how implementing IMCI affects child mortality and morbidity, while also investigating the factors that influence IMCI outcomes.

Methods

Study design and participants

A one-year cross-sectional study from January to December 2021 was conducted at PHC centers with IMCI units in Baghdad, Iraq. Forty PHCCs were randomly selected from 235 centers across both sides of the city using a lottery sampling technique. All children regularly attending these PHCCs were included using universal sampling.

Sample size

Because of challenges in estimating the population of children under five in Baghdad and anticipating a high dropout rate, the selected primary healthcare centers represented 17.0% of the total (40 out of 235) considered. Using a sample size calculator with a margin of error of ±2% and a 95% confidence level, the required sample size was determined to be 1335, calculated with the formula: $N = [(z^2 * p * (1 - p)) / e^2]$.

Inclusion and exclusion criteria

The study included all children aged one week to 59 months, of both genders, listed in the IMCI records, and present during interviews at the chosen 40 PHCCs. Excluded were cases with incomplete follow-up, deaths, and severe illnesses referred by PHC Centers and lacking hospital feedback responses.

Procedure

The researcher conducted thorough interviews with healthcare providers and mothers. Case management was closely observed and recorded using a comprehensive checklist. Subsequently, all cases seen at the clinic during the visit day were reviewed, necessitating 1-2 working days per PHCC, with 6 hours allocated daily over 6 days of the week. To ensure precise follow-up, communication via a phone call was established either directly with the caregiver or through other family members. Alternatively, follow-up was conducted during the child's next clinic visit within one month for vaccinations or further assessment.

Study tool

A semi-structured questionnaire, adapted from the WHO and UNICEF's IMCI form [13], was developed, comprising four sections. The initial two sections collected data on the PHC Center and healthcare providers, while the subsequent sections focused on the caregiver and child. This study emphasizes caregiver and child health, with details about the PHCC and providers addressed separately. A pilot study was conducted in a PHCC outside of the designated target centers.

Dependent and independent variables

The dependent variable was the disease outcome, categorized as either "cured or improved" or "not improved or worsened." Independent variables are numerous caregiver and child-related factors.

Statistical analysis

Data is entered and processed using SPSS version 21.0, and descriptive statistics are presented via frequency tables. Associations between variables and outcomes are identified through univariate, bivariate, and multiple logistic regression analyses. Significant independent predictors are determined at a 95% confidence interval, with a p-value of less than 5%, using adjusted odds ratios for interpretation.

Results

Descriptive data of caregiver

Table 1 revealed the descriptive data of caregivers. The study mainly comprised mothers, constituting 97.8% of the participants, with a significant portion (75.8%) falling within the 20 to 30-year age group. A majority identified as housewives (59.2%), and many had attained primary or secondary education levels (52.2%). Additionally, a substantial portion of mothers belonged to families with middle incomes (61.4%) and lived in households with 5-6 members (50.8%). Most had one child below 5 years of age (59.2%), and the majority resided in medium-quality housing environments (56.5%). Concerning healthcare facilities and antenatal care history, the majority found accessibility to primary healthcare centers easy (97.8%), while a significant portion received regular antenatal care (42.4%). Most parents displayed a positive attitude toward vaccination (63%), and caregivers reported satisfaction with maternal and child health (MCH) services (62.9%). However, a notable proportion (58.3%) favored traditional medicine for treating their child, and less than half of the mothers were knowledgeable about at least two danger signs (44.3%).

Table 1: Frequency distribution of caregiver-related variables (n=835).

No.	Variables	Categories	N (%)
1.	Age	< 20 years	102 (12.2)
		20-30 years	633 (75.8)
		> 30 years	100 (12.0)
2.	Relation to child	Relative	18 (2.2)
		Mother	817 (97.8)
3.	Occupation	Housewives	494 (59.2)
		Employee	238 (28.5)
		Worker	103 (12.3)
4.	Had other children below 5 years	One child	494 (59.2)
		2 children	238 (28.5)
		>2 children	103 (12.3)
5.	Educational degree	Read and write	134 (16.0)
		Primary and secondary school	436 (52.2)
		Institute and college	256 (30.7)
		Postgraduate	9 (1.1)
6.	Family income	Low	190 (22.8)
		Middle	513 (61.4)
		High	132 (15.8)
7.	House environment	Bad	147 (17.6)
		Medium	472 (56.5)
		Good	216 (25.9)
8.	Family members	3-4 members	242 (29.0)
		5-6 members	424 (50.8)
		> 6 members	169 (20.2)
9.	Accessibility of PHC center	Difficult	18 (2.2)
		Easy	817(97.8)
10.	History of antenatal care with child	Regular	354 (42.4)
		Intermittent	317 (317)
		None	164 (19.6)
11.	The attitude of parents toward vaccination	Negative	309 (37.0)
		Positive	526 (63.0)
12.	Treating a child with traditional medicine e.g. herbs	Against	348 (41.7)
		With	487 (58.3)
13.	Satisfaction of caregivers with MCH services	Not satisfied	310 (37.1)
		Satisfied	525 (62.9)
14.	Mother's knowledge of at least 2 danger signs	None	465(55.7)
		At least 2 danger signs	370 (44.3)

Description of child-related variables

Table 2 illustrates child-related factors. A significant proportion of children (60.0%) were aged between 6 to 35 months. Anthropometric measurements revealed that most children had normal weight (87.5%), height (95.9%), and mid-arm circumference within the normal range (91.1%). The majority of children were bottle-fed (44.2%), and a significant portion did not exhibit recurrent infections or delayed wound healing (57.6%). Among the 164 registered neonates under 2 months, only 104 cases (12.5%) showed signs of local bacterial infections. The majority (82.9%) had a normal neonatal history. About 39.9% had received vaccinations regularly but had not completed the schedule. Common diagnoses for current diseases were diarrhea (24.3%) and acute respiratory infections (23.4%). Severity-wise, most cases were classified as mild (48.4%) or moderate (29.9%). Primary healthcare centers administer various drugs, with 23.1% receiving symptomatic treatment, 17.7% receiving supplementary medications, and 15.8% receiving antibiotics alongside symptomatic drugs. Most treated children (71.5%) completed their prescribed regimens at home. The duration between illness onset and medical consultation varied, with 42.0% seeking help within a day, 24.8% delaying for two days, and 33.2% waiting longer. A minority (19.3%) were referred to hospitals, while the majority (80.7%) were treated at primary care clinics, with 80.7% not requiring hospital admission. Concurrent diseases were rare, with only 10.5% experiencing comorbidities such as malnutrition, diabetes mellitus, urinary tract infections, or asthma.

Table 2: Frequency distribution of child-related variables (n=835)

NO.	Variables	Categories	N (%)
1.	Age of child	Below 2 months	121 (14.5)
		2-6 months	164 (19.6)
		6-12 months	246 (29.5)
		13-35 months	255 (30.5)
		3-5 years	49 (5.9)
2.	Weight	Normal	731 (87.5)
		Underweight	86 (10.30
		Sever underweight	12 (1.4)
		Overweight	6 (0.7)
3.	Height (length)	Average	801(95.9)
		Short	28 (3.4)
		Very short	6 (0.7)
4.	Midarm circumference	Average	761 (91.1)
		Thin	68 (8.1)
		Very thin	472 (0.7)
5.	State of feeding	Strict breastfeeding	153 (18.3)
		Bootle feeding	369 (44.2)
		Missed feeding	313 (37.5)
6.	Recurrent infections or delayed healing	Few	298 (35.7)
		Often	56 (6.7)
		None	481 (57.6)
7.	Local bacterial infection (n=116)	Present	12 (1.4)
		Absent	104 (12.5)
8.	Neonatal history	Normal	692(82.9)
		LBW	33 (4.0)
		Jaundice	45 (5.4)
		Convulsion	37 (4.4)
		Prematurity	28 (3.4)
9.	Vaccination according to schedule	Regular but not completed	333 (39.9)
		Not regular	257 (30.8)
		Completed	105 (12.6)
		None	140 (16.8)
10.	Diagnosis of current disease	Diarrhea	203 (24.3)
		Ear problem	62 (7.4)
		ARI	195 (23.4)
		Jaundice	92 (11.0)
		Short stature	37 (4.4)
		Anemia	55 (6.6)
		Fever	73(8.7)
		Throat problem	68 (8.1)
		Malnutrition	50(6.0)
11.	Severity of disease	Mild	404 (48.4)
		Moderate	250 (29.9)
		Severe	181 (21.7)
12.	Drug given in PHC center	ORS	87 (10.4)
		Symptomatic	193(23.1)
		Supplementary	148 (17.7)
		Oral antibiotic, symptomatic	132 (15.8)
		ORS, supplementary	53(6.3)
		None	139 (16.6)
		Parenteral antibiotic, symptomatic	83 (4.4)
13.	Duration between illness and medical visit	One day	351 (42.0)
		2 days	207 (24.8)
		> 2 days	277 (33.2)
14.	Treatment at home	Completed	597(71.5)
		Not completed	133 (15.9)
		None	105(12.6)
15.	Concurrent disease	None	747 (89.5)
		Malnutrition	49 (5.9)
		Diabetes mellitus (DM)	11 (1.3)
		Urinary tract infection (UTI)	13 (1.6)
		Asthma	15(1.8)
16.	Referral to hospital	Referred	161 (19.3)
		Not referred	674 (80.7)
17.	Hospital admission	Not Admitted	675 (80.8)
		Fully admitted	123 (14.7)
		Not fully admitted	37 (4.4)

Bivariate analysis of caregiver and child-related variables on the outcome of IMCI implementation

The study investigated the impact of caregiver and child-related factors on IMCI outcomes using bivariate analysis. Significant associations emerged, notably with the severity of illness, severe cases of diarrhea, and ARI showing worsened or not improved outcomes ($\chi2 = 18.900$, $p < 0.001$), ($\chi2 = 6.265$, $p= 0.016$), and ($\chi2 = 7.549$, $p= 0.003$), respectively. Additionally, factors such as exclusive breastfeeding, prompt medical visits within one day of illness onset, and completion of home treatment were linked to cured or improved outcomes ($\chi2 = 22.521$, $p< 0.001$), ($\chi2 = 42.347$, $p < 0.001$), and ($\chi2 = 47.420$, $p<0.001$), respectively. These findings are summarized in Table 3.

Table 3: Bivariate analysis of health provider-related variables on the outcome of IMCI implementation (n=835)

No.	Variables	Categories	Cured or improved 642 (76.9%)	Worsened or not improved 193 (23.1%)	χ 2	p-value
1.	Severity	Mild and moderate	572 (87.5)	82 (12.5)	18.900	0.000
		Severe	70(38.7)	111 (61.3)		
2.	Diagnosis of disease (A)	Other than diarrhea	499 (79.0)	133 (21.0)	6.265	0.016
		Diarrhea	143 (70.4)	60 (69.6)	7.549	
3.	Diagnosis of disease (B)	Other than ARI	508 (79.4)	132 (20.6)	9.552	0.003
		ARI	134 (68.7)	61 (31.3)		
4.	Child feeding	Bootle and mixed	502 (73.6)	180 (26.4)	22.521	0.000
		Strict breastfeeding	140 (91.5)	13 (8.5)		
4.	Duration between illness & medical visit	2 days and more	333 (68.8)	151(31.2)	42.347	0.000
		One day	309 (88.0)	42 (12.0)		
5	Treatment at home	None or not completed	126 (52.9)	112 (47.1)	47.420	0.000
		Completed	516 (86.4)	81 (13.6)		

Multiple logistic regression

A logistic regression analysis examined factors influencing IMCI outcomes, revealing significant associations with mild and moderate illness severity (Odds Ratio (OR) = 10.634, 95% CI: 6.985 to 16.192, $p < 0.001$), strict breastfeeding (OR = 3.307, 95% CI: 1.703 to 6.421, $p < 0.001$), and completing treatment at home (OR = 6.190, 95% CI: 4.115 to 9.311, $p < 0.001$). These factors contributed to improved outcomes through IMCI services. Model adequacy was confirmed by the Hosmer and Lemeshow test, showing a good fit ($p = 0.202$). Additionally, the overall model was significant ($p = 0.001$) and explained 40.9% of the variance (Nagelkerke R square = 0.409).

Table 4: Factors associated with the outcome of IMNCH implementation in multiple logistic regression (n=835)

Variables	Category	*B*	SE	Wald	P-value	OR	95% CI
Severity of illness	Mild and moderate	2.364	0.214	121.479	0.000	10.634	6.985–16.192
	Severe					Reference	
Child feeding	Strict breastfeeding	1.196	0.339	12.484	0.000	3.307	1.703-6.421
	Bootle and mixed					Reference	
Treatment at home	Completed	1.823	0.208	76.577	0.000	6.190	4.115–9.311
	None or not completed					Reference	

Discussion

In this study, a significant association between the severity of cases and outcome of illnesses; namely severe diarrhea ($p < 0.001$)) and severe pneumonia ($p= 0.016$) which exhibit a higher tendency for poor outcome (failed improvement or worsening) than other illnesses. Similarly, Getachew and colleagues [14] discovered significant associations between various factors such as roof material, hand washing facility, presence of latrine facility, presence of feces around the pit hole, presence of feces around the house compound, and risk of contamination of household storage with diarrheal morbidity among under-five Ethiopian children. In Zimbabwe, Chari et al. [15] identified determinants linked to diarrhea among children under 5 years, including being partially vaccinated, collecting water more than 1 kilometer from a household, and using untreated water. Additionally, Paul [16] found that child stool disposal, floor materials, and roof materials in Indian households were significant predictors of childhood diarrhea occurrence among environmental factors. Additionally, the findings of this study can be justified by some social and environmental factors such as the poor circumstances preceded by the COVID-19 pandemic [17] which dramatically affected the crumbled quality of care in Iraqi hospitals [18], where the severe cases are admitted but suffered low level of intensive care [19], little intravenous fluid (I.V.) fluids and antibiotics as well as a shortage of health personnel, this is notably prominent in severe pneumonia, on the other hand, a lot of severe cases were accompanied by other diseases like malnutrition & anemia; thus, the current illness can

be exacerbated contributing to lower outcome; it is manifested mainly in severe diarrhea. The global strategy for infant and young child feeding [20] acknowledges breastfeeding's significance as the optimal method for feeding infants in their first year, alongside the timely introduction of supplementary foods. Additionally, mounting evidence suggests breastfeeding aids in post-pregnancy maternal health by facilitating the return to normal metabolism and weight loss gained during pregnancy [21, 22]. Seeking prompt medical attention for children within 24 hours of illness onset has been shown to have a significant impact on improving disease outcomes [23]. Early medical intervention can prevent the progression of illnesses, reduce complications, and facilitate timely treatment, leading to better recovery rates and overall health outcomes for children [24]. In many developing nations, including Iraq, children receiving treatment at primary healthcare centers often need to complete their treatment regimen at home [25]. However, a concerning trend emerges where caregivers halt treatment once they perceive the child's recovery, leading to health setbacks and contributing to antibiotic resistance. This underscores the importance of promoting adherence to complete treatment courses [26]. The study encountered several limitations. Firstly, being a cross-sectional study, it couldn't establish causality between variables. Additionally, data collection was hindered by the COVID-19 pandemic, leading to lower-than-expected case visits at PHC Centers and making assessment more challenging. Furthermore, there was a notable loss of follow-up due to indirect outcome confirmation via phone calls, resulting in missing data. Moreover, the reliance on subjective information from caregivers or substitutes posed further challenges to the follow-up process.

Conclusion

In summary, caregiver-related factors such as exclusive breastfeeding, timely medical attention, and completion of home-based treatment significantly influence disease outcomes. Furthermore, when considering factors related to primary healthcare infrastructure collectively rather than individually, they also play a significant role in determining outcomes. This suggests that a comprehensive approach, addressing both caregiver behaviors and healthcare infrastructure, is essential for improving overall health outcomes in communities. Additionally, to enhance IMCI outcomes, several measures can be taken. First, establishing a referral system with feedback mechanisms from general hospitals to primary healthcare centers can ensure seamless continuity of care. Second, fostering community partnerships can engage local communities in promoting child health and well-being. Third, enhancing the case management skills of healthcare providers through targeted implementation training courses can improve the quality of care provided. Lastly, implementing a maturity model information system and adopting electronic IMCI tools can streamline processes, saving time and effort while leading to improved outcomes.

Abbreviation

IMCI: Integrated Management of Childhood Illness; IMNCI: Integrated Management of Neonatal and Childhood Illness; PHCC: Primary Healthcare Centers; MCH: Maternal and Child Health; DM: Diabetes mellitus; UTI: Urinary trat infection; OR; Odds Ratio: SD: Standard Deviation; I.V.: Intravenous Fluid; COVID-19: Coronavirus Disease

Declaration

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Availability of data and materials

Data will be available by emailing mustafa.ircs@uoanbar.edu.iq

Authors' contributions

Mustafa Ali Mustafa Al-Samarrai (MAMA) conceived and designed the study, analyzed and interpreted the data; drafted the manuscript; and revised the manuscript. Ali Abd Ali Sahib (AAAS) participated in analyzing and interpreting the data, and revised the manuscript.
All authors read and approved the final manuscript.

Ethics approval and consent to participate

We conducted the research following the declaration of Helsinki. The ethical approval was obtained from the Scientific Committee of Al Nahrain University [Ref. No.: T-B2/3/646 on 5th April 2021; M.M.M./139 on 4th April 2021], and the Directory of the health of Baghdad city [Ref. No.: 31743 on 6th April 2021].

Consent for publication

Not applicable

Competing interest

The authors declare that they have no competing interests.

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References

1. World Health Organization. Child Health and Development Unit, Integrated Management of Childhood Illness. [Internet]. Available from: https://www.who.int/teams/maternal-newborn-child-adolescent-health-and-ageing/child-health/integrated-management-of-childhood-illness. Accessed on 11th January 2024.
2. World Health Organization Child and Adolescent Health, Integrated Management of Childhood Health. [Internet]. Available from: https://www.emro.who.int/child-adolescent-health/imci/index.html. Accessed on 11th January 2024.
3. World Health Organization (WHO). Regional Health Observatory Data Repository, Implementation of IMCI: Iraq. [Internet]. Available from: http://rho.emro.who.int/rhodata/node.main.A163?lang=en14. Accessed 11 February 2024.
4. World Health Organization (WHO). Media Centre, Iraq scales up efforts to improve maternal and child health in line with Dubai Declaration commitments. [Internet]. Available from: http://www.emro.who.int/media/news/maternal-child-health-iraq.html. Accessed 12 February 2024.
5. Tawfiq WA. Integrated management of childhood illnesses "IMCI": the situation in Iraq (Abstract, Al Nahrain University website), 2009. [Internet]. Available from: http://www.nahrainuniv.edu.iq/en/node/1759. Accessed 25 February 2024.

6. Yasin EA, Abd-Al Ghafoor AH, Mustafa MA. Knowledge of health providers in Salahuddin towards integrated management of neonate & child health in year 2014. Med J Tikrit Univ. 2016;21(1):148-59.
7. Al-Samarrai MA, Jadoo SA. Impact of training on practical skills of Iraqi health providers towards integrated management of neonatal and childhood illness: A multicenter cross-sectional study. J Ideas Health. 2018;1(1):1-6. doi: 10.47108/jidhealth.vol1.iss1.2.
8. Abdulrahman A, et al. Implementation of Integrated Management of Childhood Illness Strategy's in Al Hadbaa Primary Health Care Center in Mosul City. Ann Coll Med Mosul 2019;41(1):75-80. doi:10.33899/MMED.2019.161297. Available from: doi: 10.33899/mmed.2019.161297.
9. Raoof SM, Raoof RD, Ibraheem MA. Evaluation of application of nutritional status assessment for children under 5 years by using IMCI program in a sample of primary health care centers in Baghdad City. Al-Kindy Coll Med J. 2018;14(2):1-7. https://doi.org/10.47723/kcmj.v14i2.56.
10. Hussein SS, Farhood HF. 2019. Assessment of knowledge and practical skills among integrated management of neonatal and childhood illness program healthcare personnel in primary healthcare centers. Med J Babylon 16(4):351. doi: 10.4103/MJBL.MJBL_50_19.
11. Mazin Khalid Abdullah et al. "Evaluation of the performance, knowledge among IMCI Trained Health Workers in Primary Health Care Centers in Baquba City." Dwight's Journal of Music, 13 (2017): 37-45. https://doi.org/10.26505/DJM.13013340405.
12. Sharhan MA, Ali MG. Evaluation of Health Care Professional Knowledge toward Integrated Management of Childhood Illness at the First Health Sector of Amara. Kufa J Nurs Sci. 2021;11(1):206-211. https://doi.org/10.36321/kjns.vi20211.461.
13. UN Joint Programme (UNFPA/ UNICEF/WHO). Assessment of the Integrated Management of Newborn and Childhood Illnesses Lao PDR, 27 March – 7 April 2017. [Internet]. Available from: https://www.unicef.org/laos/media/951/file/Assessment%20of%20the%20Integrated%20Management%20of%20Newborn%20and%20Childhood%20Illnesses%20%20Lao%20PDR%20.pdf. Accessed 15 February 2024.
14. Getachew A, Tadie A, G.Hiwot M, et al. Environmental factors of diarrhea prevalence among under five children in rural area of North Gondar zone, Ethiopia. Ital J Pediatr. 2018;44:95. https://doi.org/10.1186/s13052-018-0540-7.
15. Chari S, Mbonane TP, Van Wyk RH. Social and Environmental Determinants of Diarrheal Diseases among Children under Five Years in Epworth Township, Harare. Children (Basel). 2023 Jul 6;10(7):1173. https://doi.org/10.3390/children10071173.
16. Paul P. Socio-demographic and environmental factors associated with diarrhoeal disease among children under five in India. BMC Public Health. 2020 Dec 7;20(1):1886. https://doi.org/10.1186/s12889-020-09981-y.
17. Ali Jadoo SA. The second wave of COVID-19 is knocking at the doors: have we learned the lesson? Journal of Ideas in Health. 2020 Oct. 8;3(Special1):183-4. https://doi.org/10.47108/jidhealth.vol3.issspecial1.72.
18. Ali Jadoo SA, Alhusseiny AH, Yaseen SM, Al-Samarrai MAM, Mahmood AS. Evaluation of health system in Iraq from people's point of view: a comparative study of two different eras. Journal of Ideas in Health. 2021 May 20;4(2):380-8. https://doi.org/10.47108/jidhealth.vol4.iss2.100.
19. Ali Jadoo SA, Yaseen SM, Al-Samarrai MAM, Mahmood AS. Patient satisfaction in outpatient medical care: the case of Iraq. Journal of Ideas in Health. 2020 Aug. 26 ;3(2):176-82. https://doi.org/10.47108/jidhealth.vol3.iss2.44.
20. World Health Organization. Global Strategy for Infant and Young Child Feeding. Geneva, Switzerland: WHO and UNICEF; 2003.
21. Dieterich CM, Felice JP, O'Sullivan E, Rasmussen KM. Breastfeeding and health outcomes for the mother-infant dyad. Pediatr Clin North Am. 2013 Feb;60(1):31-48. https://doi.org/10.1016/j.pcl.2012.09.010.
22. Al-Samarrai MAM, Al-Rawi RA, Yaseen SM, Ali Jadoo SA. Knowledge, attitude, and practice of mothers about complementary feeding for infants aged 6-12 months in Anbar Province, Iraq. Journal of Ideas in Health. 2020 May 9;3(1):125-9. https://doi.org/10.47108/JIDHEALTH.VOL3.ISS1.17.
23. Larson E, Hermosilla S, Kimweri A, Mbaruku GM, Kruk ME. Determinants of perceived quality of obstetric care in rural Tanzania: a cross-sectional study. BMC Health Serv Res. 2014;14:483. https://doi.org/10.1186/s12913-014-0483-0.
24. Boskabadi H, Maamouri G, Sadeghian MH, Ghayour-Mobarhan M, Heidarzadeh M, Shakeri MT. Early detection of developmental problems in children with a history of neonatal icterus. Child Care Health Dev. 2010;36(1):20-24. https://doi.org/10.1111/j.1365-2214.2009.01022.x.
25. Abdulraheem IS, Parakoyi DB. Factors affecting mothers' healthcare-seeking behaviour for childhood illnesses in a rural Nigerian setting. Early Child Dev Care. 2009;179(5):671-683. https://doi.org/10.1080/03004430802072479.
26. Radyowijati A, Haak H. Improving antibiotic use in low-income countries: an overview of evidence on determinants. Soc Sci Med. 2003;57(4):733-744. https://doi.org/10.1016/s0277-9536(02)00422-7.