

Original Article

KNOWLEDGE AND PRACTICES OF MOTHERS REGARDING INTEGRATED MANAGEMENT OF NEONATAL AND CHILDHOOD ILLNESS COMMUNITY COMPONENT IN THE PERI URBAN AREA OF LAHORE

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ABSTRACT

Background: The Integrated Management of Childhood Illness (IMCI) strategy was created in 1992 by the World Health Organization (WHO) and the United Nations Children's Emergency Fund (UNICEF) to address the five major causes of child mortality: diarrhoea, pneumonia, malaria, measles and malnutrition. Its community component (IMCI-C) focuses on important health practices within households and communities for child survival. The current study aimed to assess the knowledge and practices of IMCI-C among mothers in a peri-urban area of Lahore, Pakistan.

Material and Methods: A cross-sectional study was conducted in Shah di Khoi, Johor Town, Lahore involving 1250 mothers' of 2932 children under the age of five; 180 mothers were selected using systematic random sampling. Information about the mothers' sociodemographic characteristics, knowledge and practices related to IMCI-C was collected. The data were analysed using SPSS version 21. The frequency percentages for outcome variables of overall knowledge and practices of IMCI-C were calculated; the chi-square test was applied for statistical significance with a p-value ≤ 0.05 .

Results: Overall knowledge and practices of mothers regarding IMCI-C were 91.1% and 95% respectively, with a significant association between the age of the child and the mother's knowledge regarding IMCI-C ($\chi^2 = 7.935$, p-value=0.019). No statistical significance of age, education, occupation income of mothers and their knowledge and practice of C-IMNCI was observed.

Conclusion: A high level of knowledge and practices was reported among the mothers highlighting a good literacy rate (73%) and the role of lady health workers in promoting the health of children under five.

Key Words: Knowledge, Pneumonia, Malaria, Literacy

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INTRODUCTION

The world has made significant progress in reducing the under-five mortality rate, decreasing it from 93 deaths per 1000 live births in 1990 to 37 deaths per live births in 2020.¹

A large portion of under-five deaths in 2020 were concentrated in two regions: sub-Saharan Africa, where 55% of deaths occurred and South Asia, where 27% of deaths occurred. These deaths were mainly due to preventable and treatable infectious diseases.¹ The mortality rate of children under five years of age per thousand live births in Pakistan was 65.2 per 1000 live births in 2020.² In 1992, the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) developed the Integrated Management of Childhood

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Illnesses (IMCI) strategy to address the major causes of child mortality including diarrhea, pneumonia, malaria, measles and malnutrition. The strategy was introduced in the Eastern Mediterranean Region in 1996.³ The Integrated Management of Childhood Illnesses (IMCI) strategy has three main components: Improving the clinical and communication skills of health workers; Improving overall health systems, including policy, planning and management, financing, human resources, medicines and supplies, referral, monitoring, and health information systems, supervision, evaluation, and research and Improving family and community health practices. These practices related to child health and development when implemented in targeted communities, would improve child survival, growth, and development.⁴ In Pakistan, IMCI was introduced in September 1998, and its community component was launched in March 2002.⁵

Care for newborns was included in IMCI in 2003 and the strategy was retitled IMNCI.⁶ The WHO-UNICEF package for community care includes newborn care at home, care for a child, healthy growth and development, and care for the sick child in the community.⁷ Families need knowledge and skills to provide suitable care, motivation to sustain new practices, and support from the community and the health system.⁸

IMNCI is a holistic approach that addresses the key factors influencing childhood health and mortality. It provides a framework for effective case management, disease prevention, and comprehensive care, while also engaging communities to promote positive childcare practices and support the well-being of children.⁴

The integration of community-level interventions into comprehensive primary child health care strategies, aligned with the principles of primary health care (PHC), has faced delays in many countries. This delay hampers the effective coordination of childcare interventions between the health

system and the community and it prevents reaching the most vulnerable populations.⁴

The current global architecture, including the transition from Millennium Development Goals (MDGs) to Sustainable Development Goals (SDGs), emphasizes Universal Health Coverage (UHC), revitalized PHC and the UN Secretary-General's Global Maternal, Newborn, and Child Health (MNCH) Strategy. This shift places greater emphasis on health determinants and recognizes the need for community engagement and interventions that go beyond the health sector.⁹

The IMCI community component advocates for community participation as a means of achieving sustainability, in line with the principles of PHC. It recognizes the need for the active involvement of families and communities in planning and implementing childcare interventions. This approach is crucial for achieving the Sustainable Development Goal target 3.2, which aims to reduce child mortality to 25 or fewer deaths per 1000 live births by 2030. It is especially important to implement key components of IMCI at scale in countries with a high burden of preventable childhood mortality.¹⁰

In a study conducted in Northern Uganda, the overall knowledge of caregivers about the community component of IMCI was found to be 13.3% (n=59). The study found that 59% (n=261) had adequate knowledge of breastfeeding, 17% (n=75) on complementary feeding/weaning. Knowledge was found to be better regarding immunization, where 85.3% (n=377) had adequate knowledge.¹¹ A study conducted among rural nursing mothers in Nigeria reported that the majority (90.5%) of the mothers had high knowledge about IMCI-C practices. The IMCI-C practices utilization among the mothers was rated according to mean. The most used IMCI-C practices were found to be child immunization (mean=2.98) and the use of insecticide-treated mosquito nets (mean=2.97).¹²

Few studies have been conducted related to the community component of IMCI in Pakistan including knowledge and practices with all four domains. A study conducted in Gadap Town, Karachi, found 67.4% knowledge and 68.8% practices by respondents which had positive results in reducing diarrhea morbidity.¹³ Another study conducted in a slum community of Karachi reported that only 15.8% of women had fair knowledge about pneumonia and 19.2% of mothers knew its preventive measures including immunization. Additionally, 60.8% of respondents were unable to recognize the signs and symptoms of pneumonia.¹⁴ The objective of the present study is to assess the knowledge and practices related to the community component of IMNCI among mothers in a peri-urban area of Lahore. The rationale behind this study is to have a baseline assessment of the current knowledge and practices of IMNCI-C among respondents as they are the primary caregivers of their children and data on these parameters are scarce for this population.

MATERIAL AND METHODS

A cross-sectional study was conducted in Shah di Khoi, a peri-urban area in Lahore, Johar Town, Lahore from November 2016 to December 2016. There were 2079 houses and 1250 mothers' of 2932 children under the age of five residing in the study universe. The sample size was calculated using a standard formulation $n = \frac{z^2 \times \hat{p}(1-\hat{p})}{\epsilon^2}$ (EPI info) based on the prevalence of overall adequate knowledge of the community component of IMCI among mothers i.e. 13.3% with a 95% confidence level and a 5% margin of error.¹¹ A total of 180 mothers who met the inclusion criteria were selected through systematic random sampling, where every seventh mother was enrolled. The researcher maintained the confidentiality of the participants and obtained written consent from the respondents and approval from the Institutional Ethical Committee of Allama Iqbal Medical College, Lahore. (Letter no 25.05/ERB/25th)

Data were collected using a pre-tested, self-structured, close-ended questionnaire that included questions related to the knowledge and practices of mothers about the community component of the Integrated Management of Neonatal and Childhood Illness (IMNCI-C). Each question had four choices and each correctly answered question earned one point. The data were checked by the investigator at the point of data entry concerning predetermined correct responses developed from the latest WHO recommendations.⁸

The dependent variables in this study were the knowledge and practices of mothers regarding the IMNCI-C. Independent variables included the age of the respondent, education, occupation, total family income and age of the child. The overall knowledge of the study respondents regarding IMNCI-C was assessed through 19 questions in four domains: physical growth and mental development, disease prevention, appropriate home care, and seeking care. Knowledge was scored as adequate (score ≥ 10) or inadequate (score < 9.0). Adequate knowledge was defined as achieving a minimum of 50% of correct answers. The overall practices of study respondents regarding IMNCI-C were evaluated through 16 questions in four domains. Practice was scored as adequate (score ≥ 8) or inadequate (score < 7) with a minimum 50% of correct answers defined as adequate practice.

The data were entered and analysed using SPSS version 21.0. Simple frequency distribution tables were generated for sociodemographic variables such as age, education, occupation, total family income, and age of the child, as well as overall knowledge and practices of the respondents regarding each of the four main areas of the community component of IMCI-C. Cross tabulation was done for variables of interest such as age, education, occupation, total income and age of the child affecting knowledge and practices among mothers. The chi-square test was applied to determine any statistically significant effect of these factors on knowledge and practices among

mothers regarding the community component of IMCI-C. A p-value ≤ 0.05 was considered statistically significant.

RESULTS

About 84 (46.7%) respondents were 26-30 years of age having a mean age of 27.86 ± 4.214 years whereas 119 (66.1%) children belonged to 6-24 months of age. Out of 180 children, 90 (50%) were males. Regarding the educational status of respondents, 48 mothers (26.7%) were

illiterate whereas the rest had some formal education from primary to above matric level. The educational status of the fathers showed that 41 (22.8%) were illiterate whereas the rest had some formal education from primary to above matric level. Of 177(98.3%) mothers out of 180 were housewives. The economic status of the study participants showed that 168(93.4%) had a total family income \leq of 6,000 PKR per capita. (Table -1)

Table-1: Sociodemographic characteristics of study respondents regarding IMNCI_C Knowledge and Practices (n=180)

Characteristics	Frequency	Percentage (%)
Age of mother		
20-25 years	58	32.2
26-30 years	84	46.7
31-35 years	35	21.1
Mean age = 27.86 years + 4.214		
Age of children		
6 months – 24 months	119	66.1
25 months -42 months	49	27.2
43 months – 60 months	12	6.7
Mean age = 22.23 months +12.30		
Educational status of respondents		
Illiterate	48	26.7
Literate	132	73.3
Educational level of fathers		
Illiterate	41	22.8
Literate	139	77.2
Occupation of respondents		
House wife	177	22.8
Others	3	77.2
Occupation of Fathers		
Private employee	74	41
Others	106	59
Sex of children		
Male	90	50
Female	90	50
Income per capita (PKR)		
<6000	168	93.4
>6000	12	6.6

Overall Knowledge of study respondents regarding IMNCI – C:

Out of 180 mothers, 161(91.1%) had overall adequate knowledge of IMNCI-C. About 152 (84.4%) and 134 (74.4%) mothers had adequate knowledge about physical growth/mental development and home management of illness among children under five respectively. (Figure-1). For physical growth and development, almost all

mothers 180 (100%) regarded breastfeeding as the best food for babies up until 6 months. Regarding the disease prevention component, 170 (94.4%) had adequate knowledge about the schedule of the first vaccine for a newborn whereas 169 (93.9%) had adequate knowledge about home treatment of diarrhea. However, only 83 (46.1%) had adequate knowledge regarding care-seeking and treatment (Table -2).

Table-2: Knowledge regarding the four main components of IMNCI-C among study respondents

Knowledge: the four main areas of IMNCI – C among respondents		Adequate knowledge N (%)	Inadequate knowledge N (%)
Knowledge: Physical growth and mental development <i>Adequate knowledge (Score 5-8) - Inadequate knowledge (Score ≤ 4.0)</i>			
i)	The best food for baby during the first 6 months of life (Mother's milk)	180(100%)	0
ii)	The term exclusive breastfeeding means (Only breast milk along with medicine or vitamin/mineral drops)	46 (25.6%)	134(74.4)
iii)	The optimal duration of exclusive breastfeeding (6 months)	146(81.1%)	34(18.9%)
iv)	The importance of exclusive breast feeding (It gives an infant the best chance to grow and stay healthy)	140(77.8%)	40 (22.2%)
v)	The minimum frequency of breast feeding for a young infant of 6 months /day (At least 8 times/day)	50(27.8%)	130(72.2%)
vi)	The appropriate weaning age (6 months)	148(82.2%)	32(17.8%)
vii)	Common types of weaning foods offered initially (Kitchri/dalia/mashed banana, boiled potatoes etc)	174 (96.7%)	6(3.3%)
viii)	Total duration of breast feeding along with weaning foods(24 months /2 years)	154(85.6%)	26(14.4%)
Total		152(84.4%)	28(15.6%)
Knowledge: Disease prevention <i>Adequate knowledge (Score 2.5-5.0) - Inadequate knowledge (Score ≤ 2.5)</i>			
i)	The best method of prevention from childhood infections (Immunization)	89(49.4%)	91(50.6%)
ii)	Diseases for which the child is immunized by EPI schedule (Any 4 or more) Tuberculosis, Diphtheria, Pertussis, Tetanus, Polio, Pneumonia, Meningitis, Hepatitis B, Measles	38(21.1%)	142(78.9%)
iii)	The schedule of the first vaccine for a newborn (At birth)	170(94.4%)	10(5.6%)
iv)	The schedule of the first measles vaccine for an infant (At 9 months)	62(34.4%)	118(65.6%)
v)	The best precaution before feeding the child (Hand washing)	165(91.7%)	15(8.3%)
Total		118(65.6%)	62(34.4%)
Knowledge: Home management of childhood illness <i>Adequate knowledge (Score 1.6 - 3) - Inadequate knowledge (Score ≤ 1.5)</i>			
i)	Feeding during illness (More breast milk and other fluids to be offered to a sick child)	68 (37.8%)	112 (62.2%)
ii)	Home treatment of child having diarrhea (Oral Rehydration Solution)	169 (93.9%)	11 (6.1%)
iii)	Home treatment of a child with cough and cold (Keep the child warm and dry, safe home remedies to soothe throat)	133 (73.9%)	47 (26.1%)
Total		134(74.4%)	46(25.6%)
Knowledge: Care seeking and treatment <i>Adequate knowledge (Score 1.6 - 3) - Inadequate knowledge (Score ≤ 1.5)</i>			
i)	Care seeking for a sick child suffering from diarrhea (Child is not able to drink or breastfeed , sunken eyes)	73 (40.6%)	(59.4%)
ii)	Care seeking for a sick child suffering from cough and cold (Child is having fast breathing, lower chest in the drawing)	89(49.4%)	91(50.6%)
iii)	Importance of follow up (If treatment prescribed is effective)	97(53.9%)	83(46.1%)
Total		83(46.1%)	97(53.9%)

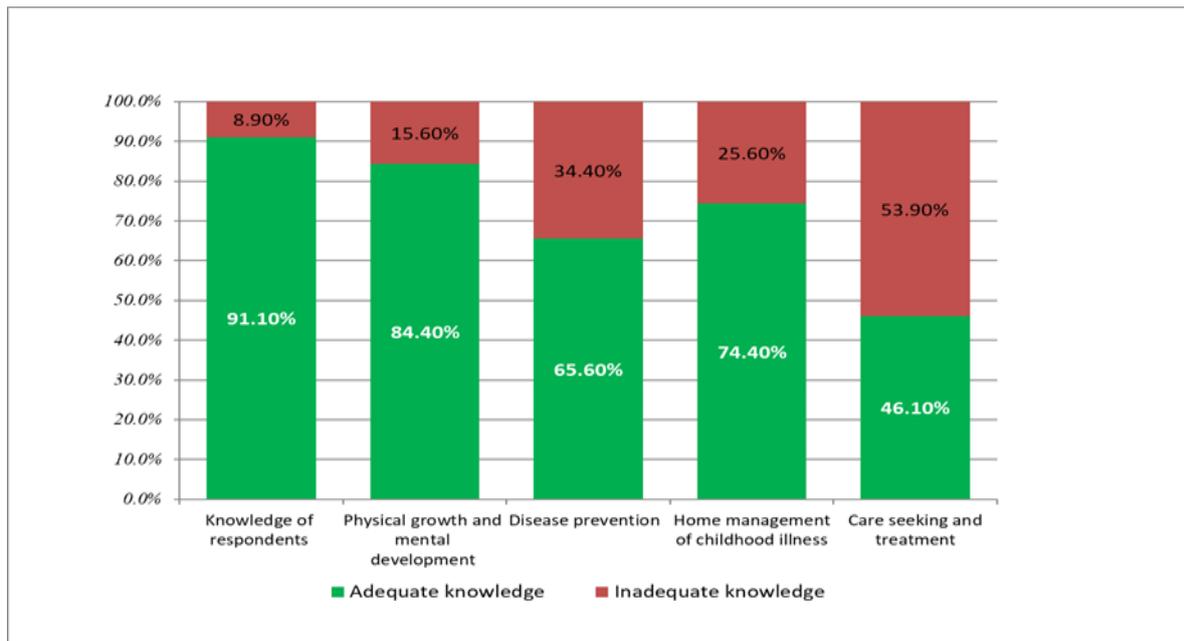


Figure 1: Overall Knowledge of study respondents regarding IMNCI – C

Overall Practices of study respondents regarding IMNCI – C:

As regards the practices of IMNCI-C, the majority of mothers 171 (95%) had adequate practices. Adequate practices in the domain of physical growth/development and care seeking / treatment were reported by 113(62.8%) and 126(70%)mothers respectively. (Figure-2). About 100 (55.6%) and 106(58.9%) mothers had adopted age-

appropriate breast feeding and weaning practices respectively. In the area of disease prevention, BCG vaccination against tuberculosis was confirmed by immunization scar in 162(90%) children. Oral polio vaccine coverage was reported by all respondents. Regarding home management of childhood diarrhoea, 163(90.6%) children were offered extra fluids. (Table -3)

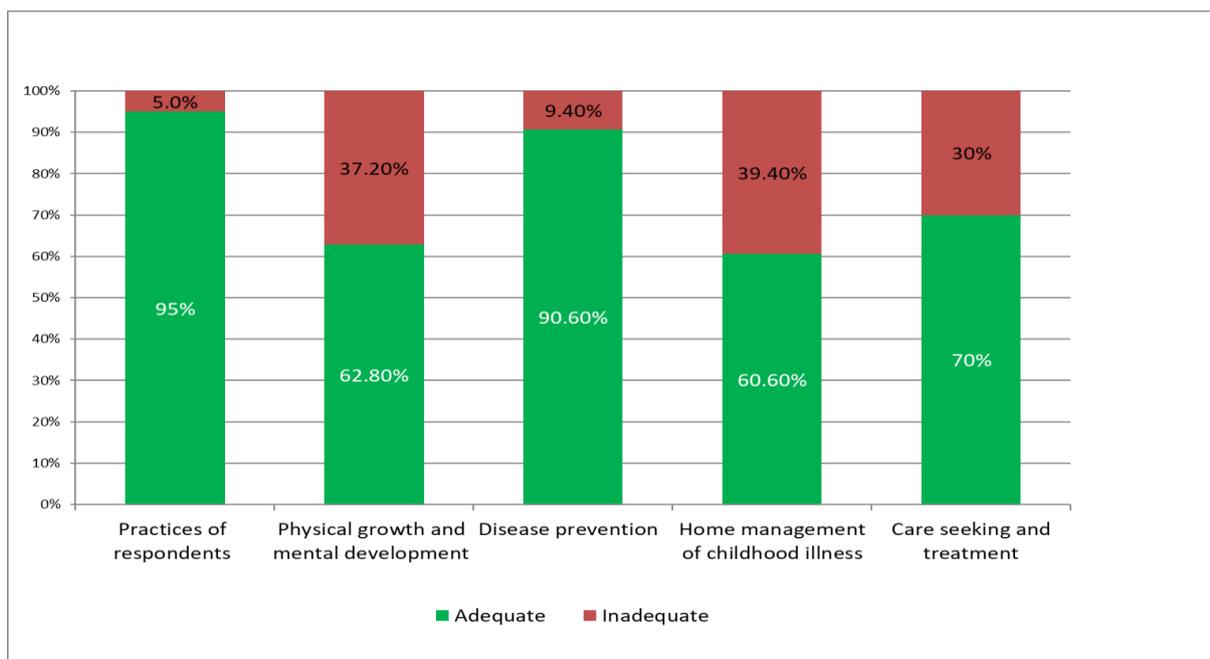


Figure-2: Overall Practices of study respondents regarding IMNCI – C

Table-3: Practices regarding the four main areas of IMNCI – C among study respondents

Practices: the four main areas of IMNCI – C among respondents		Adequate Practice N (%)	Inadequate Practice N (%)
Practice: Growth and development <i>Adequate Practice (Score 2.5-5.0) - Inadequate Practice (Score ≤ 2.5)</i>			
i)	Breast feeding for 6 months(exclusive breast feeding)	103(57.2%)	77(42.8%)
ii)	Total duration of breast feeding(according to age)	100(55.6%)	80 (44.4%)
iii)	Starting age of complementary feeding (6 months)	106(58.9%)	74(41.1%)
iv)	Types of common weaning foods offered to the child in the last 24 hours	177(98.3%)	3(1.7%)
v)	Frequency of food serving according to age	32(17.8%)	148(82.2%)
Total		113(62.8%)	67(37.2%)
Practice: Disease prevention <i>Adequate Practice(Score3-4) - Inadequate Practice(Score ≤ 2)</i>			
i)	BCG vaccination against tuberculosis (by immunization scar)	162(90%)	18(10%)
ii)	Confirmation of Immunization status (by card)	101(49.1%)	79(43.9%)
iii)	Oral polio vaccination (drops in the mouth every)	180(100%)	00.0
iv)	Hand washing practice (Any 3 or more options)	173(96.15)	7(3.9%)
Total		163(90.6%)	17(9.4%)
Practice: Home management of childhood illness <i>Adequate Practice(Score 2.5-5.0) - Inadequate Practice(Score ≤ 2.5)</i>			
i)	Feeding during illness(more frequently and for longer)	39(21.7%)	141 (78.3%)
ii)	The extra fluid after each loose stool(Yes)	163 (90.6%)	17 (9.4%)
iii)	Method of giving ORS to a sick child(Frequent small sips from a cup or spoon)	97 (53.9%)	83(46.1 %)
iv)	ORS after the child vomited (wait 10 minutes before giving more fluid, give slowly)	87(48.3%)	93 (51.7%)
v)	Home management of cold and cough (Any one option) (Keep the child warm and dry, safe home remedies to soothe throat)	136(75.6%)	44(24.4%)
Total		109(60.6%)	71(39.4%)
Practice: Care seeking and treatment <i>Adequate Practice(Score 1-2) - Inadequate knowledge (Score ≤ 0)</i>			
i)	Recognition of 2or more danger signs	172 (95.6%)	8 (4.4%)
ii)	Follow up visit	133(73.9%)	47(26.1%)
Total		126(70%)	54(30%)

There was a significant statistical association between the age of children and mothers' knowledge regarding IMNCI-C ($\chi^2 = 7.935$, P value = 0.019). No statistical significance of

age, education, occupation, or income of mothers was reported in association with their knowledge and practices of C-IMNCI.(Table-4)

Table-4: Relationship of age, education, occupation, income per capita and age of the child with overall knowledge regarding IMNCI-C among respondents.

	Knowledge Score		P -Value	χ^2
	Inadequate knowledge (Score \leq 9.0)	Adequate knowledge (Score 10 -19)		
Age of Mothers				
20-30 years	14(87.5%)	127 (77.4%)	0.351	0.869
31+	2(12.5%)	37(22.6%)		
Education of Mothers				
Illiterate	5(31.1%)	43(26.2%)	0.664	0.189
Literate	11(68.8%)	121 (73.8%)		
Occupation of Mothers				
Housewife	16(100%)	161(98.2%)	0.585	0.298
Working	0(0.00%)	3 (1.7%)		
Income per capita				
PKR1000-6000	16(100%)	152(92.7%)	0.263	1.254
PKR 6001and	0(0.00%)	12 (7.3%)		
Age of Child				
6-24 months	7 (43.8%)	112(68.3%)	0.019	7.935
25-42 months	9(49.3%)	40(24.4%)		
43-60 months	0(0.0%)	12(7.3%)		
Total (180)	16	164		

DISCUSSION

In our study, adequate overall knowledge of IMNCI-C was reported in 91.1% of mothers. It might be due to the flexible knowledge scale used and better literacy rate among mothers as 73% of respondents were having some formal education from primary level to master. It agrees with a study conducted in Nigeria which stated that 90.5% of the mothers had a piece of high knowledge about IMCI-C practices and the respondents were fairly educated.¹²

A high level of knowledge may be attributed to various other factors such as guidance transferred from family members like grandmothers, mothers, elder sisters and friends. Also, our religion provides advice about breast feeding and cleanliness. Our study area was in the vicinity of a tertiary care hospital from where many of our respondents might get information regarding the care of their children. The role of the lady health worker is very important especially in our area of research as she focused on health education regarding nutrition (breast feeding, weaning) and vaccination advice. The study

aligns with previous research conducted in India, which assessed the effectiveness of structured teaching on knowledge of IMCI guidelines among mothers. The study found that 90% of mothers had average knowledge, 10% had good knowledge scores in the pre-test, and after structured teaching, 66% of mothers were in the excellent grade and 34% had good knowledge grades.¹⁵

The community component of IMNCI focuses on the role of sixteen key health practices within the household and community for child survival, growth and development, divided into 4 main areas. This study assessed the knowledge of these four areas among the participating mothers and showed that three of the fourth mothers had adequate knowledge regarding the physical growth and mental development of children under five. Mothers' knowledge of breast feeding is a good indicator to achieve breastfeeding practices. All mothers knew that mother's milk is the best food for a baby during the first six months of life which is consistent with a study conducted in India.¹⁶ Weaning is often beneficial in reducing early infant mortality. The current study found that

above eighty percent of mothers knew the appropriate age for weaning and knowledge of common weaning foods which is consistent with a study conducted in Nigeria which found that most of the mothers possessed a good knowledge of feeding and weaning.¹⁷

Additionally, our study found that nearly two third mothers had adequate knowledge of disease prevention, mothers agreed that immunization is the best method to prevent childhood infections which is in line with studies conducted in Cyprus (64%)¹⁸ and Georgia (68%).¹⁹ Proper hand washing is considered the first line of defence against the spread of many illnesses. In this study, the majority of mothers considered hand washing as the best precaution before feeding their child congruent with the studies done in Ethiopia (47.8%)²⁰ and Saudi Arabia (83.8%)²¹

Our study concluded that three fourth of respondents had adequate knowledge of home management for diarrhea and pneumonia. It aligns with a study conducted in Eastern Ethiopia.²² A community-based study in Al Mukalla, Yemen found that about eighty percent of urban mothers had good knowledge of pneumonia prevention.²³ A study conducted in Myanmar also found that mothers had high levels of knowledge of childhood pneumonia and moderate overall self-efficacy in-home care for children with pneumonia.²⁴

Appropriate care-seeking behaviour refers to mothers who seek out care for their children with general danger signs from proper healthcare providers. The current study found that less than half of mothers had adequate knowledge of care-seeking and treatment similar to a study in Ethiopia where 44.7% of mothers had good knowledge of the general danger signs for care seeking of common childhood illnesses.²⁵

Regarding the practice of IMNCI-C, a high majority of mothers had overall adequate practices. Practices of IMNCI-C are profoundly affected by the mothers' knowledge. Higher knowledge about IMNCI-C among mothers leads them to

utilize IMNCI services more. A high level of knowledge and an even better level of practice were reported in our study. A variety of psychological and social factors responsible for better maternal awareness and its application include beliefs, cultural experiences, norms and expectations, available support and existing attitudes. It could be due to the better education, guidance by experienced family members and awareness imparted by lady health workers. The four key area practices were reported as growth and development, disease prevention, home management and care seeking. A study conducted in Colombia evaluated the 18 key practices of the IMCI-C strategy among caregivers, the most used practices were related to disease control (80% to 99.3%), although a high percentage of caregivers did not recognize the warning signs. Less commonly used practices were related to health promotion and disease prevention (23% to 57.9%) as caregivers thought them unworkable.²⁶

A recent study found that above sixty percent of mothers had adequate practices in growth and development promoting activity specifically in optimal breast and complementary feeding. This is supported by the demographic and health survey of Pakistan, which reported that exclusive breastfeeding among children under 6 months of age has increased from 38% in 2012-13 to 48% in 2017-18.²⁷ Age-appropriate breastfeeding practices by mothers reported in our study were following the demographic and health survey of Pakistan(54%).²⁷

Appropriate complementary feeding and weaning depend on precise information and proficient assistance from the family, community and healthcare system. The age-appropriate weaning practices by mothers found in our study are consistent with studies conducted in Sudan²⁸ and South India²⁹ where 62% and 63.35% of mothers started weaning their children promptly, respectively.

Above ninety percent of mothers had adequate practices regarding disease prevention in our study. BCG vaccination

was confirmed by scar in the majority of children and Oral polio vaccination was reported by all. Basic Immunization status (by card) was less than fifty percent in contrast to a study conducted in Urban Multan where 91% of children received age-based full basic immunization. It might be due to the difference in the study area.³⁰ The overall coverage for completely immunized children between the ages of 12-23 months in Pakistan is 66%, with significant inequality among provinces.²⁷ A study conducted in 8 districts of southern Pakistan found that only 30.8% of children were fully vaccinated, 46% were incompletely vaccinated, and 23% were non-vaccinated.³¹ Proper handwashing practices have a vital role in reducing the burden of childhood diseases. The present study found that above ninety percent of mothers practised handwashing adequately in contrast to a study from Northwest Ethiopia where only 39.1% of mothers practised good handwashing probably because of their lower socioeconomic status.³²

The study established that about sixty percent of mothers had adequate practices related to the home management of childhood illnesses, and most of the mothers gave extra fluids to their sick child which is similar to a study in Nepal³³ where mothers gave more fluids than usual to their child during diarrhea. However, a study from Saudi Arabia found that although 62% of mothers knew about oral rehydration therapy, only 23.5% of them used it. The reason was an inadequate level of awareness of respondents and insufficient public info on the subject.³⁴ A study conducted in Ethiopia revealed that 58% of mothers had poor practices in home-based diarrhea management, it might be because 45% of mothers were illiterate.²² The current study found that three fourth of mothers correctly managed their child's cold and cough at home in agreement with a study from Yemen where rural mothers used home remedies (61.3%).²³

The health-seeking behaviour of mothers for childcare depends on the proper recognition of key symptoms of illness. Adequate practices of care seeking and treatment were

reported by two thirds of caretakers similar to a study in Kenya where 56.9% of the respondents brought the child to the hospital immediately after observing danger signs.³⁵ The differences observed in the results of various studies could be because mothers were exposed to different types and amounts of information due to variable sociodemographic and cultural patterns. Moreover, different scales were used to determine adequate and inadequate practices of C-IMNCI in the various studies.

There was a significant statistical association between the age of children and mothers' knowledge regarding IMNCI-C in the current study. Mothers of children between the ages of 2 to 5 years were less likely to have adequate knowledge than mothers of children between 6 and 24 months. It is supported by other studies done in Burkina Faso³⁶ and Bangladesh³⁷ that found that mothers/caregivers of children between 2-5 years old engaged in less care-seeking behaviours. Mothers might think age below two years is a crucial period for children with the illness so they tend to take care of their younger children more than the older ones.

No statistical significance was specified regarding the age, occupation and income per capita of mothers and their knowledge and practices of IMNCI-C. The same is true for the education of mothers and their knowledge and practice of IMNCI-C in contrast to the studies conducted in Nigeria¹², Ethiopia³⁸ and Zimbabwe³⁹ which have shown that the education of the child's mother or caregiver is an important factor for optimal childrearing and improving child survival.

Improvement in family and community participation is very important for IMNCI to be successful. Successful implementation of the IMNCI strategy requires raising awareness of the benefits of IMNCI among policymakers, healthcare providers, professional associations, non-governmental organizations, the private sector, donors, and the general public.

It is important to tailor interventions and strategies to the specific circumstances of a given country. Further research on family and

community behaviours can help to develop effective interventions for the prevention and management of childhood illnesses in the home and community setting.

It was a community study in peri urban setting which focused on all four domains of IMNCI-C. The systematic random sample selection and a complete lack of non-consenters added strength to our study.

One limitation of this study is that it relied on mothers' self-report of their knowledge and practices regarding the community component of IMNCI, rather than observing them directly. As a result, their responses may not fully reflect their actual practices. Additionally, the results cannot be generalized as this was a cross-sectional study done in a peri urban setting.

CONCLUSION

Overall knowledge and practices of mothers in peri urban areas, regarding IMCI-C were adequate, with a significant association between the age of the child and the mother's knowledge regarding IMCI-C. No statistical significance of age, education, occupation income of mothers and their knowledge and practice of C-IMNCI was appreciated.

AUTHORS CONTRIBUTION

MJK: Contributes to the conception, design, execution and analysis and final interpretation of data, article writing (abstract, objective, introduction, discussion) accountable for all aspects of the manuscript.

SH: Supervised all the activities of the study. Participated in drafting and revising the manuscript critically. Finally approved the manuscript.

ZPB: Assisted in SPSS data entry, data analysis, result writing up and interpretation of results.

SA: Helped in editing, and assisted in writing the final results for the manuscript conclusion and recommendations.

REFERENCES

1. Child survival / Under five mortality [Internet]. December 2021. Available from: <https://data.unicef.org/topic/child-survival/under-five-mortality/#sthash>.
2. Pakistan (PAK) -Demographics,Health &Infant mortality [Internet]. 2020. Available from: <https://data.unicef.org/country/pak/>.
3. Julia Ross KLaLW. Community-based Integrated Management of Childhood IllnessPolicy Guidance. In: (USAID) CGaUSAID, editor. January 2009.
4. IMCI | Child and adolescent health: WHO Regional Office for the Eastern Mediterranean; [Available from: <https://www.emro.who.int/child-adolescent-health/imci/index.html>].
5. Implementation of IMCI in Pakistan. Strategy-implementation. Child health and development.: WHO Regional Office for the Eastern Mediterranean; [Available from: <https://www.emro.who.int/child-health/strategy-implementation/implementation-of-imci-in-pakistan.html>].
6. (MCSP) TMacSP. Review of Newborn Health Content in Integrated Management of Newborn and Childhood Illnesses and Integrated Community Case Management Training Materials and Job Aids in Seven Maternal and Child Survival Program Countries. 2019 September 17.
7. Community based interventions|Child and Adolescent health: WHO Regional Office for the Eastern Mediterranean; [Available from: <https://www.emro.who.int/child-adolescent-health/community-based-interventions/index.html>].
8. World Health Organization. Framework for the community component of the integrated child care strategy. WHO. Regional Office for the Eastern Mediterranean; 2002.
9. Qazi S. WHO/UNICEF Integrated Management of Childhood Illness (IMCI) and Child Health Redesign. 2019.
10. 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>.
11. Mukunya D, Kizito S, Orach T, Ndagire R, Tumwakire E, Rukundo GZ, et al. Knowledge of integrated management of

- childhood illnesses community and family practices (C-IMCI) and association with child undernutrition in Northern Uganda: a cross-sectional study. *BMC Public Health*. 2014 Dec;14:1-7.
<https://doi.org/10.1186/1471-2458-14-976>
12. Akwataghibe NN, Ogunsola EA, Broerse JE, Popoola OA, Agbo AI, Dieleman MA. Exploring factors influencing immunization utilization in Nigeria—a mixed methods study. *Frontiers in public health*. 2019 Dec 20;7:392.
 13. K Khaliq A, Amreen, Jameel N, Krauth SJ. Knowledge and practices on the prevention and management of diarrhea in children under-2 years among women dwelling in urban slums of Karachi, Pakistan. *Matern Child Health J*. 2022 Jul;26(7):1442-52.
<https://doi.org/10.1007/s10995-022-03391-9>
 14. Eliyas A, Serali S, Khan I, Khan K, Hashmi F. Mothers knowledge related preventive measure of pneumonia in slum community, Karachi, Pakistan. *Pak J Health*. 2018 Dec 11;8(3):156-9.
<https://doi.org/10.32413/pjph.v8i3.181>.
 15. Dani MR, Pandhare MP. Effect of Structured Teaching on Knowledge Regarding Management of Diseases as per IMNCI Guidelines among the Mothers of Under-Five Children's At Anganwadis. *Nveo-natural volatiles & essential OILS Journal| NVEO*. 2021 Nov 27:8767-73.
 16. Siddha S. A cross sectional study on breastfeeding and weaning practices among pregnant and lactating women. *METHODOLOGY*. 2018 Jun;5(06).
 17. Akpor O, Oluwadare T, Taiwo O, Aladenika B, Akpor O. Feeding and weaning practices among mothers of under-five children in selected primary health care centres in adokiti, ekiti, nigeria. *Potravinarstvo*. 2020 Jan 1;14(1).
 18. Kyprianidou M, Tzira E, Galanis P, Giannakou K. Knowledge of mothers regarding children's vaccinations in Cyprus: A cross-sectional study. *PLoS One*. 2021 Sep 20;16(9):e0257590.
<https://doi.org/10.1371/journal.pone.0257590>
 19. Verulava T, Jaiani M, Lordkipanidze A, Jorbenadze R, Dangadze B. Mothers' knowledge and attitudes towards child immunization in Georgia. *Open Public Health J*. 2019 May 31;12(1).
[doi: 10.2174/1874944501912010232](https://doi.org/10.2174/1874944501912010232)
 20. Dagne H, Bogale L, Borchia M, Tesfaye A, Dagne B. Hand washing practice at critical times and its associated factors among mothers of under five children in Debar town, northwest Ethiopia, 2018. *Ital J Pediatr*. 2019 Dec;45:1-7.
<https://doi.org/10.1186/s13052-019-0713-z>.
 21. Ayaz WO, Priyadarshini A, Jaiswal AK. Food safety knowledge and practices among Saudi mothers. *Foods*. 2018 Nov 25;7(12):193.
<https://doi.org/10.3390/foods7120193>
 22. Workie HM, Sharifabdilahi AS, Addis EM. Mothers' knowledge, attitude and practice towards the prevention and home-based management of diarrheal disease among under-five children in Diredawa, Eastern Ethiopia, 2016: a cross-sectional study. *BMC pediatrics*. 2018 Dec;18:1-9.
<https://doi.org/10.1186/s12887-018-1321-6>
 23. Al-Noban MS, Elnimeiri MK. Mothers knowledge, attitude and practices regarding acute respiratory infection in children under five years/urban and rural Areas-AI Mukalla city-2022. *EJUA-BA* 2022 Jun 30;3(2):93-100.
<https://doi.org/10.47372/ejua-ba.2022.2.157>
 24. Naing MP, Payakkaraung S, Sanasuttipun W. Factors Predicting Mothers' Self-efficacy in Providing Home Care for Children with Pneumonia in Yangon, Myanmar. *Nurs Sci J Thai*. 2022 May 17;40(3):120-34.
 25. Gebreslasie S, Welu G, Berhane B, Gebresilassie B, Fseha B, Tsegay T, et al. Exploring knowledge on danger signs of common childhood illnesses and associated factors among mothers of under-five children in Central Tigray, Ethiopia: a cross-sectional study. *Germs*. 2020 Mar;10(1):9.
[doi: 10.18683/germs.2019.1175](https://doi.org/10.18683/germs.2019.1175)
 26. Padilla-Choperena C, Amador-Ahumada C, Puello-Alcocer E. Effectiveness of the implementation of community IMCI strategy in Montería, Colombia. *Enfermería Global*. 2018 Oct 1;17(4):265-77.
 27. National Institute of Population Studies - NIPS/Pakistan, ICF. Pakistan Demographic and Health Survey 2017-18. Islamabad, Pakistan: NIPS/Pakistan and ICF; 2019.
 28. Ahmed AA. Complementary Feeding and Weaning Practices among Women In Omdurman Althora Locality And Their Influencing Factors. 2021.

29. J Jabeen A, Amberina AR, Gayathri V, Eshwar MD, Dodda S, Begum GS, et al. Assessment of breastfeeding, weaning, and complementary feeding practices among women attending a Tertiary care teaching hospital in South India. *Cureus*. 2022 Sep 5;14(9). doi: 10.7759/cureus.28791
30. Ijaz B, Javed R, Iqbal S, Yousaf R, Raza A. Knowledge, attitude & practices among parents living in urban areas of multan about routine vaccination of their children under five years of age. *JNMU*. 2019;2(1):9-14.
31. Riaz A, Husain S, Yousafzai MT, Nisar I, Shaheen F, Mahesar W, et al. Reasons for non-vaccination and incomplete vaccinations among children in Pakistan. *Vaccine*. 2018 Aug 23;36(35):5288-93. <https://doi.org/10.1016/j.vaccine.2018.07.024>.
32. T Taddese AA, Dagne B, Dagne H, Andualem Z. Mother's handwashing practices and health outcomes of under-five children in Northwest Ethiopia. *Pediatric health, Med. Ther*. 2020 Mar 11:101-8. doi: 10.2147/PHMT.S238392.
33. Shah S, Shreshta M, Sharma B, Pandey N, Dahal S. Knowledge and Practice on Childhood Diarrhea among Mothers having Children Under Five Years of Age in Madhuban, Sunsari-Nepal. *Religion*. 2019;20(42):29-1.
34. Alghadeer S, Syed W, Alhossan A, Alrabiah Z, Babelghaith SD, Al Arifi MN, et al. Assessment of Saudi mother's knowledge and attitudes towards childhood diarrhea and its management. *Int J Environ Res Public Health*. 2021 Apr 9;18(8):3982. <https://doi.org/10.3390/ijerph18083982>.
35. Wambui WM, Kimani S, Odhiambo E. Determinants of health seeking behavior among caregivers of infants admitted with acute childhood illnesses at Kenyatta National Hospital, Nairobi, Kenya. *Int. J. Pediatr*. 2018 Dec 16;2018. <https://doi.org/10.1155/2018/5190287>.
36. Badolo H, Bado AR, Hien H, Méda N, Susuman AS. Factors associated with mothers' health care-seeking behaviours for childhood fever in Burkina Faso: findings from repeated cross-sectional household surveys. *Glob Health Res Policy*. 2022 Dec;7(1):1-2. <https://doi.org/10.1186/s41256-022-00270-2>.
37. Akter S, Banna MH, Brazendale K, Sultana MS, Kundu S, Disu TR, et al. Determinants of health care seeking behavior for childhood infectious diseases and malnutrition: a slum-based survey from Bangladesh. *J Child Health Care*. 2022 Feb 14:13674935211057714. <https://doi.org/10.1177/13674935211057714>.
38. Dessie ZB, Fentie M, Abebe Z, Ayele TA, Muchie KF. Maternal characteristics and nutritional status among 6–59 months of children in Ethiopia: further analysis of demographic and health survey. *BMC pediatrics*. 2019 Dec;19(1):1-0. <https://doi.org/10.1186/s12887-019-1459-x>.
39. James N, Acharya Y. Integrated management of neonatal and childhood illness strategy in Zimbabwe: An evaluation. *Glob Public Health*. 2021 Nov 22;1(11):e0000046.