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Research Article

Assessment of Integrated Management of Childhood Illness (IMCI) Approach in Alexandria, Egypt

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Abstract: The aim of this study is to assess the Integrated Management of Childhood Illness (IMCI) approach in Alexandria, Egypt. Study design was a cross sectional comparative study. The study was conducted in two settings related to Ministry of Health; primary care facilities applying IMCI and the other setting not applying IMCI the sample size amounted to 200 infant and children. Observation was used as a tool to assess performance of child health care providers during caring for sick children in the study setting, in addition to supervisory checklist, focus group discussions and also reviewing the child's medical records. The researcher interviewed mothers and caretakers using a structured interview method. Results revealed that classification score percentage was higher in units applying IMCI than units not applying IMCI. The difference between the units was statistically significant in relation to assessment, classification and counseling. Also, counseling was mainly done by physicians in both units applying and units not applying IMCI but it ranked higher in units applying IMCI. The ideal treatment cost was less in units applying IMCI. Performance was much better in units applying IMCI mother's satisfaction was significantly high among those enrolled to units applying IMCI. Also, majority of the trained health staff participating in the study strongly agreed that IMCI is better than the traditional system of sick child management.
Keywords: sick, child, management, integrated, treatment, cost, satisfaction, attitude.

INTRODUCTION

The world's approach to children has changed dramatically. The idea that children have special needs has given way to the conviction that children have right [1]. Ensuring the rights and well- being of children is the key to sustained development in a country and to peace and security in the world. Since the earliest days of its existence, UNICEF has called the world's attention to the situation [2].

Infant and child mortality remains unacceptably high in developing countries. About 12 million children die annually in the under 5 years of age [3]. More than 50% of these deaths are attributed to diarrhea, acute respiratory infections (ARI), malaria or measles [4]. The same conditions are responsible for an even higher percentage of childhood illness [5]. Projections based on the 1996 analysis "The global burden of disease" indicate that these conditions will continue to be major contributors to child deaths in the year 2020 unless significantly greater efforts are made to control them [6].

Every day, millions of parents take children with potentially fatal illnesses to first-level health facilities. Most sick children present with signs and symptoms related to more than one condition. This overlap means that a single diagnosis may not be possible or appropriate and that treatment may be complicated by the need to combine therapy for several conditions [1]. Staff in such facilities is already treating these conditions and adequate clinical skills are essential to improve the care. Surveys of the management of sick children at these facilities reveal that many are not properly assessed and treated and that their parents are poorly advised [3].

In most developing countries, diagnostic supports such as radiology and laboratory services are minimal or non-existing. Drugs and equipment, combined with an irregular flow of patients, leave health care providers at first-level facilities with few opportunities to practice complicated clinical procedures. Instead, they must often rely on history and signs and symptoms to determine a course of management that makes the best use of available resources [4]. It is important to treat the child as a whole and not simply his or her most obvious disease [6].

Providing quality care to sick children in these conditions is a serious challenge. In response to this challenge, WHO and UNICEF developed a strategy known as Integrated Management of Childhood Illness (IMCI) [4]. Since potentially fatal illnesses in children are often brought to the attention of health care providers at first level health facilities, the initial focus of IMCI has been on improving their performance through training and support [3].

The objectives of the strategy are to reduce deaths and the frequency and severity of illness and disability, and to contribute to improved growth and development [1]. IMCI strategy gives priority to the management of conditions that cause death and the greatest burden of ill health in children, especially among the low-income populations [5]. The lessons learned from disease specific control programs have been used to develop a single efficient and effective approach to managing childhood illness [3].

Hence, it is important to assess IMCI, for new combination of curative and preventive intervention that aims to improve child care practices, in order to examine its impact on infant and child morbidity and mortality in developing countries. The aim of this study is to assess IMCI in Alexandria and compare it with the traditional system of sick child management following these specific objectives: 1- Evaluating performance of health care providers, treatment cost and parent satisfaction with the service provided. 2- Measuring attitudes of IMCI trained health care providers towards IMCI.

Research questions

- Does IMCI affect performance of health care providers?
- Does IMCI influence treatment cost?
- How does IMCI establish parent satisfaction?
- Are attitudes of health care providers changed after IMCI training?

Aim of the study

To assess integrated management of childhood illness in Alexandria, Egypt.

Specific objectives

1. To compare the performance of child health care providers trained on IMCI case management with that of non-trained providers.
2. To determine the potential impact of using IMCI guidelines on treatment costs.
3. To compare levels of satisfaction with care between mothers of children.
4. To determine the attitude of child health care providers trained on IMCI case management towards using management guidelines.

MATERIALS AND METHODS

Study design

The study was a cross sectional comparative one.

Study settings

The study was conducted in

1. Ministry of Health and Population (MOHP) primary health care facilities applying IMCI guidelines in Alexandria, Egypt. These facilities lie in two districts: East and Montaza. They included MCH units, family health units, primary health care centers, rural health units and IMCI pediatric outpatient clinic in hospitals.
2. MOHP primary health care facilities not applying IMCI in Alexandria, Egypt. These facilities represented different types of facilities in districts other than East and Montaza including MCH units, family health units, primary health care centers, rural health units and pediatric outpatient clinics in hospitals.

Target population

The study was carried out on

1. A sample of sick children and infants (under 5 years) attending primary health care facilities applying IMCI guidelines and an equal sample of sick children and infants (under 5 years) attending primary health care facilities not applying IMCI guidelines.
2. All currently working health care providers (physicians and nurses) who received in-service training on WHO standard case management of sick children under 5 years, IMCI.
3. A sample of mothers or care takers attending primary health care facilities, applying IMCI guidelines and an equal sample of mothers or caretakers attending primary health care facilities not applying IMCI with their under 5 children.

Subjects

Out of seventeen primary health care facilities applying IMCI guidelines, ten facilities were selected. Two facilities were selected from each type of facilities not applying IMCI guidelines. Within each type of these facilities, 20 children were selected (amounting to 200 infants and children) and 20 mothers or caretakers to assess their satisfaction with the service provided. The researcher tried to include all physicians working in the IMCI clinic (one at a time) and all clinics in facilities with more than one clinic as family health units. Out of 31 primary health care facilities, 10 units were selected using simple random technique; two from each type.

For the attitude questionnaire, all currently working trained health care providers in 17 facilities applying IMCI guidelines were included purposively in the sample.

Procedure

Data collection was entirely done by the researcher and extended over a period around one year.

Observation was used to assess performance of child health care providers during caring for sick children in the study setting. An observation checklist was used to collect data about physician's compliance with the standard case management guidelines. Another observation checklist was constructed based on supervisory checklist used by IMCI supervisors in MOH for follow up of facilities applying IMCI to check staff, equipment and supplies.

Supervisory checklist used by IMCI supervisors of MOH was modified to contain information about facilities applying IMCI regarding: staff (total and trained), equipment and supply of essential drugs as described in the guidelines.

Focus group discussions (FGD) were conducted with IMCI trained health care providers working in facilities applying IMCI in both districts (East and Montaza). Two FGDs were conducted with physicians and the other two FGDs with nurses. The first FGD was attended by 6 physicians from facilities of East district and took around one hour. The second FGD was attended by 7 nurses from facilities of East district and took around 90 minutes. The third FGD was attended by 8 physicians from facilities of Montaza district and took around one hour. The fourth FGD was attended by 7 nurses from facilities of Montaza district and took around 90 minutes. There was a note taken in each FGD in addition to recording the session. The purpose of these FGDs was to gain in-depth understanding of provider's attitudes towards IMCI and to help in formulating items in the attitude questionnaire.FGD guide included questions about advantages and disadvantages of IMCI over the traditional system of sick child management, reasons for satisfaction or dissatisfaction with working in IMCI and suggestions to improve the service. Based on items resulting from FGDs, a self-reporting questionnaire was constructed and administered to health care providers to collect data including: personal data; job, year of graduation, qualifications, year of training on IMCI.

In addition, reviewing the child's medical record was carried out to obtain information about the health care provider's diagnosis, management, types and dose of drugs to estimate cost of drugs prescribed and cost of drugs that would have been prescribed had children been managed in accordance with the IMCI guidelines. Cost of drugs was calculated by bottle using trade therapeutic index used in private pharmacies.

Interviewing mothers or caretakers using a structured interviewing schedule, to assess level of satisfaction with care of the child. An interviewing questionnaire was used.

RESULTS

Table 1 Shows distribution of the study sample of infants aged less than two months according to their age in days in units applying IMCI compared to units not applying IMCI. The table reveals that infants' age ranged between 2 and 59 days with a mean of 20.74 ± 15.23 days (22.77±12.43 days and 19.83±16.45 days in units applying and units not applying IMCI respectively). The highest percentage of infants was in the second week of age (21.4%), (15.4% and 24.1% in units applying and units not applying IMCI respectively). The difference between units applying and units not applying IMCI was not statistically significant.

Table 1: Distribution of the study sample of infants aged less than two months according to their age in days in units applying IMCI compared to units not applying IMCI (Alexandria, Egypt)

Age (days)	Units applying IMCI		Units not applying IMCI		Total	
	No.	%	No.	%	No.	%
0-	1	7.6	7	24.1	8	19.0
7-	2	15.4	7	24.1	9	21.4
14-	3	23.1	4	13.9	7	16.7
21-	3	23.1	1	3.4	4	9.5
28-	2	15.4	5	17.3	7	16.7
35-	0	0.0	2	6.9	2	4.8
42-	2	15.4	1	3.4	3	7.1
49-	0	0.0	0	0.0	0	0.0
56-59	0	0.0	2	6.9	2	4.8
Total	**13**	**100%**	**29**	**100%**	**42**	**100%**
Mean	22.77 ± 12.43 days		19.83 ± 16.45 days		20.74 ± 15.23 days	

Table 2 Shows distribution of the study sample of children aged 2 months to five years according to their age in months in units applying IMCI compared to units not applying IMCI. The table illustrates that the mean age of children was 24.09 ± 15.81 months (26.06 ±16.31months and 21.93 ± 15.01 months in units applying and units not applying IMCI respectively). The highest percentage of children were in the first year of age (29.3%), (23.0% and 36.3% in units applying and units not applying IMCI respectively. The lowest percentage was 48 months or more (12.0%), (19.3% and 4.1% in units applying and units not applying IMCI respectively). The difference between units applying and units not applying IMCI was statistically significant.

Table 2: Distribution of the study sample of children aged two months to five years according to their age in months in units applying IMCI compared to units not applying IMCI (Alexandria, Egypt)

Age (months)	Units applying IMCI		Units not applying IMCI		Total	
	No.	%	No.	%	No.	%
0-	43	23.0	62	36.3	105	29.3
12-	48	25.7	48	28.1	96	26.8
24-	36	19.3	32	18.7	68	19.0
36-	24	12.8	22	12.9	46	12.9
48- 59	36	19.2	7	4.0	43	12.0
Total	**187**	**100.0**	**171**	**100.0**	**358**	**100.0**
Mean	26.06±16.31months		21.93±15.01months		24.09±15.81months	

Table 3 shows distribution of the study sample of infants aged less than two months according to performance score percentage in units applying compared to units not applying IMCI. The table demonstrates that the mean assessment score percentage was higher in units applying than not applying IMCI (75.00 ± 20.64 and 19.00 ± 12.00 respectively). The table reveals also that classification score percentage was higher in units applying than units not applying IMCI (79.61 ± 20.96 and 43.56 ± 21.25 respectively). The table also shows that the mean treatment score percentage was higher in units applying than units not applying IMCI (57.69 ±45.45 and 40.85 ±36.17 respectively). The table also illustrates that the mean counseling score percentage was higher in units applying than units not applying IMCI (56.09 ± 17.24 and 29.71 ±22.10 respectively). The table reveals that the mean grand total score percentage was better in units applying than units not applying IMCI (73.78 ± 18.95 and 23.63 ± 12.48 respectively). The difference was statistically significant in assessment, classification and counseling (z=4.911, p=0.000 – z=3.947, p=0.000, z=3.381, p=0.000 respectively).

Table 3: Distribution of the study sample of infants aged less than two months examined according to performance score percentage in all tasks in units applying IMCI compared to units not applying IMCI (Alexandria, Egypt)

Score percentage	Units applying IMCI (n=13)	Units not applying IMCI(n=29)	Significance test	
			Z (Wilknson)	P
Assessment				
Mean	75.00±20.64	19.00±12.01	4.911*	0.000
Median	83.8	16.7		
Classification				
Mean	79.61±20.96	43.56±21.25	3.947*	0.000
Median	80.0	40.0		
Treatment				
Mean	57.69±45.45	40.85±36.17	1.119	0.263
Median	66.7	33.3		
Counseling				
Mean	56.09±17.24	29.71±22.10	3.381*	0.001
Median	50.0	25.0		
Grand total				
Mean	73.78±18.95	23.63±12.48	4.802*	0.000
Median	81.0	21.10		
Total	**13**	**29**		

P< 0.05 level

Table 4 Shows distribution of the study sample of infants aged less than two months according to counseling tasks in units applying compared to units not applying IMCI. The table demonstrates that counseling was done mainly by physicians in both units applying (92.3%) and units not applying IMCI (79.3%). The table reveals also that counseling was better in units applying than those not applying IMCI as regards: feeding counseling (92.3% and 41.4% respectively), and advice for immediate follow up (23.1% and 6.9% respectively). Concerning oral drug administration, the table shows that it was explained for 75.0% of infants in units applying IMCI (37.5% was explained correctly and 37.5% was inadequately explained) compared to 84.2% in units not applying IMCI (only 5.3% was explained correctly while 78.9% was inadequately explained). Regarding local treatment administration, counseling was better in units not applying than units applying IMCI since it was explained for 64.3% of infants (28.6% was explained correctly while 35.7% was inadequately explained) compared to units applying IMCI (20.0% was explained correctly while 40.0% was inadequately explained). However, the difference between units applying and units not applying IMCI was statistically significant for feeding counseling (χ^2 = 9.507, P= 0.002) and explaining oral treatment administration (MCP = 0.037).

Table 4: Distribution of the study sample of infants aged less than two months examined according to counseling tasks in units applying IMCI compared to units not applying IMCI (Alexandria, Egypt)

Counseling tasks	Units applying IMCI (n=13)		Units not applying IMCI(n=29)		Significance test
	No.	%	No.	%	
Who counsels mothers?					Pearson χ^2
None	0	0.0	6	20.7	= 5.100
Nurse	1	7.7	0	0.0	P=0.071
Physician	12	92.3	23	79.3	
Feeding counseling					Pearson χ^2
Yes	12	92.3	12	41.4	= 9.507*
No	1	7.7	17	58.6	P=0.002
Explaining immediate follow up					
Yes	3	23.1	2	6.9	FET= 0.162
No	10	76.9	27	93.1	
Total	**13**	**100.0**	**29**	**100.0**	
Explaining reason for referral					
No	0	0.0	5	100.0	
Explaining oral treatment					
Not done					
Done incorrectly	2	25.0	3	15.8	MCP=0.037*
Done correctly	3	37.5	15	78.9	
	3	37.5	1	5.3	
Total	**8**	**100.0**	**19**	**100.0**	
Explaining local treatment					
Not done					
Done incorrectly	2	40.0	5	35.7	MCP=0.999
Done correctly	2	40.0	5	35.7	
	1	20.0	4	28.6	
Total	**5**	**100.0**	**14**	**100.0**	

P< 0.05

Table 5 Shows distribution of the study sample of children aged two months to five years according to performance score percentage in units applying compared to units not applying IMCI. Performance of the researcher was considered as a gold standard. The table demonstrates that performance score percentages were much better in units applying than units not applying IMCI. The mean assessment score percentage was 64.60 ± 19.85 in units applying IMCI compared to 26.13 ± 11.44 in units not applying IMCI. The mean classification score percentage was 84.76 ± 19.43 in units applying IMCI compared to 38.54 ± 14.59 in units

not applying IMCI. The mean nurse assessment score percentage was 71.48 ± 36.94 in units applying IMCI compared to 3.24 ± 9.43 in units not applying IMCI. The mean treatment score percentage was 67.54 ± 35.00 in units applying IMCI compared to 35.86 ± 30.62 in units not applying IMCI. The mean counseling score percentage was 59.85 ± 27.66 in units applying IMCI compared to 22.13 ± 17.89 in units not applying IMCI. The mean grand total score percentage was 67.17 ±18.95 in units applying IMCI compared to 24.04 ±8.31 in units not applying IMCI. The difference was statistically significant in all performance tasks between units applying and units not applying IMCI.

Table 5: Distribution of the study sample of children aged two months to five years according to performance score percentage in all tasks in units applying IMCI compared to units not applying IMCI (Alexandria, Egypt)

Score percentage	Units applying IMCI (n=187)	Units not applying IMCI(n=171)	Significance test	
			Z (Wilknson)	P
Assessment				
Mean	64.60±19.85	26.13±11.44	14.24*	0.000
Median	68.8	26.0		
Classification				
Mean	84.76±19.43	38.54±14.59	14.82*	0.000
Median	90.0	37.5		
Nurse assessment				
Mean				
Median	71.48±36.94	3.24±9.43	14.86*	0.000
	91.0	0.0		
Treatment				
Mean	67.54±35.00	35.86±30.62	8.28*	0.000
Median	75.0	33.3		
Counseling				
Mean	59.85±27.66	22.13±17.89	12.05*	0.000
Median	60.0	12.5		
Grand total				
Mean	67.17±18.95	24.04±8.31	14.97*	0.000
Median	71.4	23.00		
Total	**187**	**171**		

P< 0.05 level

Table 6 Shows distribution of the study sample of infants less than two months according to ideal and actual treatment cost in units applying compared to units not applying IMCI. The table demonstrates that the ideal treatment cost (prescribed by the researcher according to guidelines) was concentrated around 0.0 and less than 4.0 LE in both units applying and units not applying IMCI (92.3% and 82.7% respectively). The table reveals also that the actual treatment cost (prescribed by the physicians) of the same range (0.0 – 4.0 LE) constituted 69.2% in units applying IMCI compared to 44.8% in units not applying IMCI. Treatment cost more than 4.0 LE constituted 30.8% in units applying IMCI compared to 55.1% in units not applying IMCI. The mean actual treatment cost was higher than the mean ideal treatment cost in both units applying IMCI (3.13 ± 2.78 and 1.49 ± 1.15 LE respectively) and units not applying IMCI (5.04 ± 4.16 and 2.57± 2.75 LE respectively). However the difference between ideal treatment cost and actual treatment cost was statistically insignificant in units applying IMCI (t= 1.97, p=0.072) while it was significant in units not applying IMCI (t=2.67, p= 0.012).

Table 7 Shows distribution of the study sample of children aged two months to five years according to treatment cost in units applying compared to units not applying IMCI. The table demonstrates that ideal treatment cost (prescribed by the researcher according to guidelines) below 5.0 LE constituted 67.6% in units applying IMCI compared to 61.2% in units not applying IMCI. Actual treatment cost (prescribed by physicians) of the same range constituted 56.8% and 32.2% respectively. The mean ideal treatment cost was 4.53 ± 2.98 LE in units applying IMCI compared to 5.35 ± 4.24 LE in units not applying IMCI. The mean actual treatment cost was 5.03 ± 3.09 LE and 6.97 ± 4.44 LE respectively. The difference between ideal and actual treatment was not statistically significant in units applying IMCI (t=1.58, p= 0.116) while in units not applying IMCI it was statistically significant (t=3.44, p= 0.001).

Table 6: Distribution of the study sample of infants aged less than two months examined according to treatment cost in units applying IMCI compared to units not applying IMCI (Alexandria, Egypt)

Treatment cost in EGP	Units applying IMCI (n=13)		Units not applying IMCI (n=29)	
	No.	%	No.	%
Ideal treatment cost:				
0-	9	69.2	17	58.7
2-	3	23.1	7	24.2
4-	1	7.7	3	10.3
6-	0	0.0	1	3.4
8-	0	0.0	0	0.0
10-	0	0.0	0	0.0
12-14	0	0.0	1	3.4
Mean	1.76±1.03 EGP		2.76±2.76 EGP	
Actual treatment cost:				
0-	4	30.8	5	17.2
2-	5	38.5	8	27.7
4-	2	15.3	7	24.1
6-	1	7.7	4	13.9
8-	0	0.0	1	3.4
10-	1	7.7	2	6.9
12-	0	0.0	0	0.0
14-	0	0.0	1	3.4
16-17.55	0	0.0	1	3.4
Mean	3.40±2.73 EGP		5.41±4.07 EGP	
T test	1.97		2.67*	
Significance	0.072		0.012	

Table 7: Distribution of the study sample of children aged two months to five years according to treatment cost in units applying IMCI compared to units not applying IMCI (Alexandria, Egypt)

Treatment cost in EGP	Units applying IMCI (n=185)*		Units not applying IMCI (n=170)**	
	No.	%	No.	%
Ideal treatment cost:				
0-	125	67.6	104	61.2
5-	51	27.6	48	28.2
10-	8	4.3	13	7.6
15-	1	0.5	4	2.3
35-40	0	0.0	1	0.6
Total	185	100.0	170	100.0
Mean	4.53±2.98 EGP		5.35±4.24 EGP	
Actual treatment cost:				
0-	105	56.8	55	32.2
5-	68	36.8	85	49.7
10-	11	5.9	22	13.5
15-	1	0.5	5	2.9
20-	0	0.0	2	1.2
30- 35	0	0.0	1	0.6
Total	185	100.0	170	100.0
Mean	5.03±3.09 EGP		6.97±4.44 EGP	
T test	1.58		3.44***	
Significance	0.116		0.001	

- Two children were seen at hospital and admitted

** One child was seen at hospital and admitted

***** p<0.05**

Table 8 Shows indicators of appropriateness of sick child management in units applying IMCI compared to units not applying IMCI. The table illustrates that proportion of sick children checked for three general danger signs was 51.9% in units applying IMCI while in units not applying IMCI, no check for general danger signs was done. The table also reveals that the proportion of sick children checked for cough, diarrhea and fever was 81.8% and 36.8% in units applying and units not applying IMCI respectively. The table demonstrates that the proportion of sick children who were weighed at the day of visit and checked weight for age on growth chart was 65.2% and 2.9% in units applying and units not applying IMCI respectively. Concerning vaccination status, the table shows that the proportion of sick children whose vaccination status was checked was 86.1% and 4.1% in units applying and units not applying IMCI respectively. Regarding referral, the table demonstrates that the proportion of sick children who needed referral and were referred was 69.2% and 42.9% in units applying and units not applying IMCI respectively. As for counseling mothers, the table illustrates that the proportion of sick children whose mothers were advised to give extra fluids and continue breast feeding was 72.7% and 23.4% in units applying and units not applying IMCI respectively. The proportion of sick children whose mothers were advised to use oral drugs correctly was 66.3% and 4.1% in units applying and units not applying IMCI respectively. Concerning IMCI supplies, the table shows that the index of availability of injectable antibiotics was 81.3%, the proportion of health facilities that have supplies to provide vaccination services was 87.5% and the proportion of health facilities with at least 60% of health care providers managing children trained in IMCI was 25.0%. The difference between units applying and units not applying IMCI was highly significant for all indicators except proportion of children who need oral antibiotics who were not prescribed the drug correctly.

Table 8: Indicators of appropriate sick child managements in units applying IMCI compared to units not applying IMCI (Alexandria, Egypt)

Indicator	Units applying IMCI(n=187)		Units not applying IMCI(n=171)		Significance	
	No.	%	No.	%	z test	P
I-Assessment indicators: Children checked for 3 danger signs	97	51.5	0	0.0	14.20	0.000
Children checked for cough, diarrhea and fever	153	81.8	36	36.8	14.45*	0.000
Children checked for ear problems	107	57.2	8	4.7	13.26*	0.000
Children checked for malnutrition	122	65.2	6	3.5	16.44*	0.000
Children checked for anemia	149	79.7	11	6.4	20.99*	0.000
Children checked for temperature	161	86.1	70	40.9	9.96*	0.000
Children checked for vaccination	161	86.1	7	4.1	27.81*	0.000
Children with anemia assessed for feeding	87 (126)	69.0	22 (157)	14.0	11.09*	0.000
II-Treatment indicators: Children who needed oral antibiotic were not prescribed	9 (71)	12.7	12 (101)	11.9	0.16	0.000
Children who needed referral and were referred	9 (13)	69.2	3 (7)	42.9		
III-Counseling indicators: Caretakers advised to give extra fluids to the child	136	72.7	40	23.4		
Caretakers advised how to use oral drugs correctly	124	66.3	7	4.1		

Values in brackets are numbers of eligible cases.
*p<0.05

Table 9 Shows distribution of the study sample of mothers/caretakers according to their level of satisfaction with courtesy of staff in units applying compared to units not applying IMCI. The table demonstrates that the majority of mothers reported that courtesy was very good for physicians (96.0%), nurses (92.8%), and receptionists (92.5%) in units applying IMCI, while in units not applying IMCI, it was 88.0%, 79.5% and 81.5% respectively. The difference was statistically significant between units applying and units not applying IMCI (MCP= 0.005 for physicians, χ^2 = 16.426 and p= 0.000 for nurses, MCP= 0.001 for receptionists.

Table 9: Distribution of the study sample of mothers/caretakers according to level of satisfaction with courtesy of staff in units applying IMCI compared to units not applying IMCI (Alexandria, Egypt)

Elements of courtesy of staff	Units applying IMCI		Units not applying IMCI		Significance test	
	No.	%	No.	%	Pearson χ^2	P
Courtesy of doctors						
Very good	192	96.0	176	88.0	MCP	0.005
Good	8	4.0	23	11.5		
Bad	0	0.0	1	0.5		
Total	200	100.0	200	100.0		
Courtesy of nurses						
Very good	180	92.8	159	79.9	16.426#	0.000
Good	13	6.7	27	13.6		
Bad	1	0.5	13	6.5		
Total*	194	100.0	199	100.0		
Courtesy of receptionists						
Very good	185	92.5	163	81.5	MCP	0.001
Good	12	6.5	33	16.5		
Bad	1	0.5	4	3.0		
Very bad	1	0.5	0	0.0		
Total **	199	100.0	200	100.0		

- In one unit there was no receptionist

** In some units there were no nurses in the clinic

# $p<0.05$

Table 10 Shows reasons for dissatisfaction of the study sample of mothers/caretakers with services provided in units applying compared to units not applying IMCI the table reveals that in units applying IMCI, among the reasons for dissatisfaction were: unavailability of drugs and improper examination (mentioned by 2.0% of mothers for each) and long waiting time (1.5 %) while in units not applying IMCI, the main reasons were: no care and non-courtesy of staff (1.0% for each). The table also illustrates that 83.5% and 94.5% of mothers did not give reasons for dissatisfaction in units applying and units not applying IMCI respectively.

Table 10: Reasons for dissatisfaction of the study sample of mothers/caretakers with services in units applying IMCI compared to units not applying IMCI (Alexandria, Egypt)

Reasons for dissatisfaction	Units applying IMCI		Units not applying IMCI	
	No.	%	No.	%
Physicians:				
Physicians are not sufficient	2	1.0	0	0.0
Non-use of stethoscope in exam	2	1.0	0	0.0
Improper examination	4	2.0	0	0.0
Unsuitable treatment	1	0.5	0	0.0
Physical environment:				
No waiting area	1	0.5	1	0.5
Closed WC	0	0.0	1	0.5

WC not clean	1	0.5	1	0.5
Accessibility:				
Long waiting time	3	1.5	0	0.0
Delayed work in clinic	0	0.0	1	0.5
Service not available all the time	1	0.5	0	0.0
Expenses:				
expensive	0	0.0	1	0.5
Drugs:				
Drugs not available	4	2.0	0	0.0
Care provided:				
No care	1	0.5	2	1.0
Long examination time	0	0.0	1	0.5
Ante-natal care with child care in the same clinic	1	0.5	0	0.0
Others:				
Non-courtesy of staff	2	1.0	2	1.0
None	177	83.5	189	94.5

NB. Some mothers mentioned more than one reason

Table 11 Shows distribution of trained health staff according to their attitudes why is IMCI better than the traditional system of sick child management. The table reveals that the majority of trained health staff participating in the study strongly agreed/agreed that IMCI is better than the traditional system because of: Follow up and counseling mothers (100% each), preventive services (99.3%), referral of cases as needed (97.1%), reducing treatment cost by stressing preventive services (96.5%), systematic approach (95.7%), improving mother-physician relationship (95.0%), and covering serious diseases by stressing general danger signs (94.3%) and following standard guidelines (93.6%).

Table 11: Distribution of trained health team staff according to their attitudes why IMCI is better than the traditional system (n=141)

Item	Strongly agree		Agree		Don't know		Disagree		Strongly disagree	
	No.	%	No.	%	No.	%	No.	%	No.	%
It improved doctor-mother relationship	55	39.0	79	56.0	0	0.0	7	5.0	0	0.0
It is a systematic approach	57	40.0	78	55.3	1	0.7	5	3.5	0	0.0
It is a team work	51	36.2	75	53.2	8	5.7	7	5.0	0	0.0
It helps early detection of cases	65	46.1	67	47.5	4	2.8	5	3.5	0	0.0
It is characterized by follow up	58	41.1	83	58.9	0	0.0	0	0.0	0	0.0
Its drugs are always available	31	22.0	91	64.5	2	1.4	15	10.6	2	1.4
Its equipment are always available	31	22.0	68	48.2	2	1.4	37	26.2	3	2.1
Its records are always available	39	27.7	92	65.2	1	0.7	9	6.4	0	0.0
It is characterized by referral	68	48.2	69	48.9	0	0.0	4	2.8	0	0.0
It is characterized by a specially equipped place	38	27.0	55	39.0	4	2.8	39	27.7	5	3.5
It is characterized by mother counseling	70	49.6	71	50.3	0	0.0	0	0.0	0	0.0
It stresses preventive measures	65	46.1	75	53.2	0	0.0	0	0.0	1	0.7
It needs less examination time	11	7.8	20	14.2	3	2.1	90	63.8	17	12.1
It reduces cost by stressing preventive measures	43	30.5	93	66.0	3	2.1	1	0.7	1	0.7
It reduces cost by rationalizing antibiotic consumption	38	27.0	86	61.0	4	2.8	13	9.2	0	0.0
Serious diseases are covered by following guidelines	45	31.9	87	61.7	2	1.4	7	5.0	0	0.0
Serious diseases are covered by stressing danger signs	46	32.6	87	61.7	2	1.4	6	4.3	0	0.0
Mothers are satisfied with long examination time	39	27.7	69	48.9	8	5.7	21	14.9	4	2.8

DISCUSSION

As families have the major responsibility for caring for their children, success requires partnership between health workers and families, with support from their communities [7].

To reduce mortality in developing countries, WHO and other partners developed the IMCI strategy in mid 1990s [6]. The IMCI approach is the result of a major initiative to combine various disease specific algorithm into a single instrument which addresses most of the potentially life threatening illnesses among children in developing countries [5]. IMCI is a strategy to reduce child deaths and the frequency and severity of child illness and disability, and to promote healthy growth and development [7]. Most of the problems presented by the mothers or caretakers of sick children were addressed by IMCI algorithm [1]. The guidelines are intended to improve care by ensuring a complete assessment of the child's health, and by providing algorithm that combine presenting symptoms into a set of illness classifications for management [7]. Many developing countries have adopted the IMCI approach to the care of ill children at primary care level [8]. By 2002, IMCI had been introduced in 109 developing countries [7].

Because the researcher's assessment of children was considered as the "gold standard" to which health care providers' performance was compared, the quality of the training of the researcher was emphasized. So training of the researcher included a detailed review of IMCI program case management guidelines as well as intensive clinical training in Pediatric Department of Al Chatby University Hospital in Alexandria followed by reliability testing.

Improvement of health care provider's skills

Improving health care providers' skills was achieved by conducting the WHO 11 days training courses for physicians and developing 4 days training courses for nurses focusing on selected tasks, to improve the distribution of case management tasks and responsibilities among health facility staff. IMCI elements have also been introduced in the teaching at seven medical schools to address the issue of long term sustainability [9]. In the present study, the qualitative data demonstrated that all participating health care providers were satisfied with IMCI because it improved their efficiency in child examination and enabled them acquire new skills which led parents have more confidence in IMCI physicians and insist that they must examine their children. This can create a sort of competition between health care providers leading each of them improve his performance to gain confidence of mothers and caretakers. Maintaining the performance of health care providers after training is critical to the success of IMCI strategy. Any intervention for maintaining health care providers' performance needs to be sustainable, comprehensive (integrated into overall primary health care system) and participatory [10].

The performance of health care providers was assessed using the quality of care indicators designed by WHO. Indicator definitions cover assessment tasks, correct classification, correct treatment and correct counseling of caregivers. Health facility support indicators including availability of essential equipment and materials were also assessed [7]. The current study showed the assessment indicators as follows: proportion of children checked for three danger signs was 51.9%; proportion of children checked for the presence of cough, diarrhea and fever was 81.8%. proportion of children who have been weighed the same day of visit and checked weight for age was 65.2% and proportion of children who had their vaccination status checked was 86.1% (table 8).

The results were slightly different from the results of IMCI Health Facility Survey (HFS) done in Egypt by MOHP in collaboration with the Regional Office for Eastern Mediterranean of WHO (EMRO), 2002. The survey studied the quality of outpatient care provided to children below 5 years at primary health care facilities by health care providers trained in IMCI. A random sample of 296 children in 50 facilities was randomly selected in 10 governorates. It was reported that 94.9% were checked for three danger signs, 99.0% were checked for cough, diarrhea and fever, and 99.7% were checked for vaccination status. Health care providers knew that they were being observed by the surveyor therefore, their performance did not necessarily reflect their performance under routine circumstances [9]. The difference in results between IMCI health facility survey and current study can be explained by the longer and closer contact of the researcher with the colleague respondents and their wish to transmit their feedback about difficulties encountered during work to higher levels of authority especially IMCI coordinators in MOHP. Thus the real performance could be assessed actually.

Another cross-sectional stratified cluster survey of outpatient facilities conducted in Morocco 2005 [11] found that 85.4% of children were assessed for 3 danger signs, 95.4% were assessed for cough, diarrhea and fever, 84.1% were weighed and weight was interpreted, and 92.9% were checked for vaccination. The difference in results from the current study is attributed to the fact that it was conducted 6-12 months after training and follow up visits, so, compliance with guidelines was better.

IMCI guidelines

Common problems at first level health care facilities include poor treatment practices and improper drug use. IMCI guidelines could potentially reduce many of these difficulties [5]. IMCI has so far concentrated on outpatient management [1]. Case management

guidelines of IMCI are purposively designed to be sensitive to increase the likelihood that sick children receive the care they need [5]. IMCI guidelines can lead to appropriate management of sick children by health care providers in first level health facilities [3]. IMCI algorithm was designed to provide adequate sensitivity for detection of diseases even at the expense of specificity [4]. The guidelines are intended to improve care by ensuring a complete assessment of the child's health, and by providing algorithms that combine the presenting symptoms into a set of illness classifications for management [7]. The classification of illness performed than the detection of individual clinical signs [10]. This coincides with the current study since the median classification score percentage (79.6%) is higher than assessment score percentage (75.0%) for infants (table 3) and for children (84.7% and 64.6% respectively) (table 5).

Referral care

The IMCI guidelines are designed to be highly sensitive for the referral of patients with a possible severe illness, thus it inevitably leads to some children being referred un-necessarily [3]. The IMCI guidelines have good sensitivity for referring young infants and children with severe illness requiring admission to hospital [5]. This is in agreement with the qualitative data of the current study since health care providers agreed that an important advantage of IMCI is the referral of severely sick children to higher levels where they are provided with the needed care. At the same time, IMCI guidelines help health care providers to identify severely ill children and refer them in the proper time to receive the advanced specialized care which they need at the higher level health care facility.

Deaths in hospital often occur within 24 hours of admission. Many of these deaths could be prevented if good quality care was provided in good time. To achieve this, dangerous delays must be avoided: first, by helping mothers or other caregivers identify early the signs which show that children need medical attention; second, by ensuring that public health services are open when they are needed; and third, by making sure that health care providers refer promptly when there is an indication to do so [1]. This was demanded by parents stating that non-availability of service all the time is one of the reasons for dissatisfaction with the service (table 10) as emergency conditions can occur at anytime through the day. The qualitative data in the present work presented agreement of health care providers that among the important advantages of IMCI are providing emergency care for sick children and referral of severely diseased children to hospital where advanced care is provided by specialists. One of the suggestions of health care providers to improve the service was to increase work shifts in small units to overcome the problem of non-availability of enough clinics.

The best area of performance in units not applying IMCI was diagnosis (classification) followed by treatment for both infants and children (table 3 and 5). This can be explained by the highly qualified and long experienced health care providers (mainly pediatricians and MCH specialists) supported with diagnostic facilities like laboratory investigations and X ray, which means good judgment and clinical sense. The worst area of performance was nurse assessment (table 5) which means that nurses' role in the ordinary system of sick child care was only to record patients in registers. It was only in Family Health Units (where they were mostly head nurses) and MCH units that nurses used to measure the child's weight and temperature. Following nurse assessment was counseling the mother for both children and infants. This was done by physicians and nurses shared in Family Health Units only.

Compliance with IMCI guidelines

A review of the implementation process of IMCI in Madagscar was conducted in April 2000. Observation of 13 health workers as they managed 125 sick children in 12 health centers showed that 73% received the correct treatment, 98% were checked for general danger signs, 71% were checked for nutritional status and 79% for feeding practices.[146] In Bangladesh, the study 2005 [109] demonstrated that treatment practices were generally poor. None of the children presenting with anemia was treated correctly, 13% with pneumonia were treated correctly and 1% received a correct prescription for an appropriate antibiotic. In the study implemented in Morocco 2006 [11] health care providers in IMCI did not always follow the guidelines. That suggests that IMCI may be necessary but insufficient to achieve superior levels of quality.

These are in agreement with the results of the current study since during this first clinical assessment, the IMCI algorithm performed well in most areas. Overall, the health care providers performed well and were able to assess, classify, and treat most of the children correctly with the mean grand total performance score percentage in units applying IMCI was 73.78% for infants below two months of age (table 3) and 67.17% for children aged two months to five years (table 5). This was also agreed upon by all health care providers in the FGDs as they pointed out that IMCI guidelines help not to miss any disease by proceeding step by step even if the child's mother does not complain. The study conducted in Gezira state, Sudan [12] revealed marked improvement of health care providers' performance as IMCI algorithm was used systematically. IMCI can lead to appropriate management of sick children by health care providers in first level health facilities [13].

The best area of performance in units applying IMCI, for infants was assessment (median=83.8%) followed by classification (median=80.0%). The worst area of performance for both infants and children was counseling (median=50.0% and 60.0% respectively).

This can be explained by the fact that compliance with IMCI guidelines can lengthen examination time. Accordingly, mothers had to wait for a longer time resulting in overcrowding which explains reasons for their dissatisfaction with the service (table 10). Moreover, these children may be well known to the health care providers and frequently visiting the health care facility, thus counseling was done in previous visits and information were recorded previously. Health care providers participating in FGDs in the present study pointed out that mothers were upset with overcrowding which resulted from long waiting time. They may cause pressure on health care providers, so they may skip counseling or give it in short to see the following patient. This coincides with the study implemented in Bangladesh, 2005 [7] since health care providers made little effort to explain the necessary home treatment or to counsel caregivers.

IMCI and treatment cost

IMCI is likely to have the greatest impact in reducing the global burden of disease [1]. IMCI strategy will increase the effectiveness of care and should in time reduce recurrent costs [11]. The use of IMCI guidelines would help identify a greater number of illnesses requiring treatment. The cost of treating these additional illnesses, however, is low as drugs used are inexpensive [7]. A study was conducted in Western Uganda, 1998 [13] comparing the assessment and classification of diseases by medical assistants using IMCI algorithm with that of hospital based general medical officers, who used their clinical judgment. The study comprised 1226 children aged 2-59 months. This study illustrated that use of IMCI guidelines would have reduced the cost of medications to 0.17 US$ per child compared to the treatment cost of 0.82 US$ as prescribed by medical officer. This is compatible with results of the current study since the mean cost of treatment (ideal and actual) of children aged two months to five years in units applying IMCI were 4.53 and 5.03 EGP respectively compared to 5.35 and 6.97 EGP respectively in units not applying IMCI (table 7). The difference in units applying IMCI was not statistically significant which reflects a slight deviation from the guidelines under pressure of mothers or sometimes to express clinical experience. Another study, 1999 [7] compared the cost of drugs actually prescribed to a sample of 747 sick children aged 2-59 months in rural health facilities in Western Kenya in 1994. Results of that study revealed that even high cost estimates of drugs resulting from optimal use of these guidelines was less than cost of the drugs actually prescribed.

Participants in qualitative data agreed that IMCI helps reducing treatment cost even when using prophylactic iron as this improves the child's health and increases his resistance to illness. For multiple diagnoses, when there are no similar dual therapies, one of the treatment consequences of this condition could be an increase in the number of medications dispensed for many children. But when there are similar dual therapies, the cost is less as one antibiotic is used to treat more than one diagnosis like in pneumonia with dysentery, cotrimoxazol can be used (second line drug for treatment of pneumonia and first line drug for treatment of dysentery) [5]. The portion of the cost attributable to IMCI is not always easy to determine. The projected costs were based on the assumption that the sick children received optimal management, that inappropriate drugs would not be given [7].

For infants below 2 months, the mean treatment cost (ideal and actual) were 1.76 and 3.40 EGP respectively in units applying IMCI compared to 2.76 and 5.41 EGP respectively in units not applying IMCI (table 6). The study was concerned only with treatment cost at the outpatient session as IMCI is concerned mainly with outpatient management of sick children not taking into account the treatment cost in hospitals. The qualitative data revealed the agreement of all participants that IMCI reduces treatment cost by using certain cheap drugs (especially antibiotics) and limiting antibiotics to certain cases.

Substantial cost savings could be achieved by reducing inappropriate drug prescription through adherence to the existing national treatment guidelines [7]. This explains the significant difference between ideal and actual treatment costs in units not applying IMCI for both infants (table 6) and children (table 7) as a result of prescribing other expensive drugs under the pressure of pharmaceutical companies or to satisfy mothers or caretakers.

Parent satisfaction

Mothers were satisfied with good care provided to their children. Meanwhile, they were dissatisfied with the long waiting time and overcrowding in consequence and expressed this as a disadvantage (table 10). There was agreement of all participants in the qualitative data (physicians and nurses) that increasing the number of trained physicians is an essential suggestion to improve the service provided as it can overcome the problems of overcrowding and long waiting time. At the same time, IMCI should be widely spread to cover all under-five children. Longer waiting time in units not applying IMCI was mainly due to delay of physicians and start of work in the clinics while in units applying IMCI, longer waiting time was mainly due to longer consultation time taken for every sick child by following the standard IMCI case management guidelines.

IMCI requires considerable communication between health care providers and care givers to improve case management. With IMCI, consultation and waiting times may increase because health care providers will be evaluating the children more thoroughly [13].

Attitudes of health care providers towards IMCI

Physicians in one hospital (pediatricians) were against IMCI and said that it is mainly designed for paramedical personnel or ordinary people and not for highly qualified professionals like physicians. It can be mentioned that primary health care providers have no diagnostic facilities and are not provided with sufficient equipment. So, IMCI is a suitable easy organized tool to deal with outpatient cases and pick up severely ill children to refer them to higher levels with advanced facilities. This is compatible with the study implemented in Morocco, 2006 [11] which found that health care providers with higher level of pre-service training (physicians) were less likely to adhere to guidelines overall. This can be explained by them thinking that guidelines are inferior to clinical experience and professional judgment. Nurses may be more comfortable with guidelines because they may perceive them to be used on information and experience they do not possess. Also nurses are probably trained and socialized to follow medical orders, and adhering to guidelines is a similar behavior.

Problems with IMCI mentioned by some health care providers included missing many skin categories like skin infection and eye infection. These are included in the category of fever as bacterial infection is a leading cause of fever. There is a separate category for assessment of other problems which can include any other problems not mentioned in the guidelines. IMCI guidelines concentrate on the major causes of child morbidity and mortality while other problems are assessed at the end and can present an opportunity for health care physicians (especially physicians who suggested a wider range of antibiotics to have a degree of freedom in choice) to show their clinical experience in disease management. Guidelines provide an organized systematic way of thinking for problem solving and any problem that cannot be dealt with in primary health care facilities must be referred to hospital where specialists and advanced facilities are available.

CONCLUSION

This study revealed that the IMCI approach decreased cost of care for sick infants and children included in the study. However, it increases the mother satisfaction with care and improves the relationship between health care providers and their customers. Hence, the study yielded that IMCI is better than the traditional system of sick child management.

RECOMMENDATIONS

Generalization of IMCI to all primary health care facilities and inclusion of general practitioners in private sector into training of the program.

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