

## Original Article

# Assessment of Drug Use in Family Health Facilities in Alexandria

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## Abstract

**Background:** Rational use of drugs is an essential element in achieving quality of health and medical care for the patients and the community. However irrational use of medicines is still a worldwide problem.

**Objective(s):** Assessment of drug use in family health facilities in Alexandria, through application of drug use indicators including; prescribing indicators, patient care indicators and health facility indicators.

**Methods:** A cross-sectional descriptive study was conducted in eight randomly selected family health facilities (FHF) distributed in four randomly selected health care districts in Alexandria Governorate. An observational checklist and interview questionnaire designed based on World Health Organization/ International Network of Rational Use of Drugs (WHO/INRUD) drug use indicators and WHO guide to good prescribing were used for data collection. 600 patients were interviewed, and 240 consultation sessions and drug dispensing processes were observed.

**Results:** The most deficient drug use indicators were the patient care indicators, as none of the drugs were adequately labelled, the average consultation time was  $5.7 \pm 2.9$  minutes (compared to the optimal value  $\geq 20$  minutes) and the mean % of adequate patients' knowledge was  $56 \pm 49.7$ . As regards health facility indicators, availability of key drugs in stock was unsatisfactory, as the mean % was  $66.3 \pm 47.6$ . On the other hand, prescribing indicators were considered satisfactory.

**Conclusion:** We may conclude that patient care indicators were the most deficient among drug use indicators, especially labelling of drugs, consultation time and patients' knowledge, in addition to availability of key drugs in stock. We may recommend that rational drug prescribing should be included in the national practice guidelines of family practice.

**Keywords:** Rational drug use, WHO/INRUD drug use indicators, family health facilities

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## INTRODUCTION

Treatment with medicines is one of the most cost-effective interventions known, and the proportion of national health budget spent on medicines ranges between 10% and 20% in developed countries, and between 20% and 40% in developing countries.<sup>(1,2)</sup> Worldwide, more than half of all medicines are prescribed, dispensed or sold inappropriately, and half of all patients fail to take them correctly.<sup>(3)</sup> Lack of access to medicines and inappropriate doses result in serious morbidity and mortality, especially for childhood infections and chronic diseases, such as hypertension, diabetes, epilepsy and mental disorders.<sup>(3)</sup> Reduction in the quality of drug therapy leads to wastage of resources leading to reduced availability of other vital drugs, increased costs, increased risk of unwanted effects and the emergence of antimicrobial drug resistance.<sup>(4)</sup> The

World Health Organization (WHO) reported that a rational use of drugs requires that patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements for an adequate period of time, and at the lowest cost to them and their community.<sup>(5)</sup> For promoting rational use of drugs, WHO published "How to investigate drug use in health facilities", which includes drug use indicators developed to be used as measures of performance in three general areas related to the rational use of drugs in primary care.<sup>(6)</sup> All the indicators have been extensively field-tested in many countries and found to be relevant, easily generated and measured, valid, consistent, reliable, representative, sensitive to change, understandable, and action oriented.<sup>(7)</sup>

The results of an indicator study would be of most interest to managers and policy-makers responsible for administering a primary health care program, or to health providers responsible for supervising the quality

of medical care.<sup>(6)</sup> The current study was therefore conducted to assess drug use in family health facilities (FHF) in Alexandria, through application of drug use indicators including; prescribing indicators, patient care indicators and health facility indicators.

## METHODS

A cross-sectional descriptive study was conducted in eight randomly selected family health facilities (FHF) out of around 80 at the time of study, distributed in four randomly selected health care districts in Alexandria Governorate, which are East, West, Elmontaza and Middle health districts, during the period from August 2016 to July 2017.

Data was collected through the following:

**A- Prescription indicators:** An observational checklist based on World Health Organization/International Network of Rational Use of Drugs (WHO/INRUD) drug use indicators and WHO guide to good prescribing was used to investigate prescription indicators<sup>(6, 8)</sup> through collecting data from prescription forms retained in the pharmacy. A sample of 75 prescriptions of the last encounter of patients, were reviewed in each FHF with a total of 600 encounters.<sup>(6)</sup>

The following data were calculated:

- Average number of drugs per encounter.
- Percentage of drugs prescribed by generic name.
- Percentage of encounters with an antibiotic/an injection prescribed.
- Percentage of drugs prescribed from Essential Drug List (EDL).

**B- Patient care indicators:** An interview questionnaire based on WHO/INRUD drug use indicators was designed to assess patient care indicators and patient's knowledge about dispensed medications.<sup>(6)</sup> A sample of 75 patients whose prescriptions were selected, were interviewed in each FHF with a total of 600 patients.<sup>(6)</sup> Consultation time and dispensing time were calculated by observing 30 patients in each FHF. A total of 240 consultation sessions and 240 dispensing processes were observed based on WHO/INRUD drug use indicators.<sup>(6)</sup> Dispensing time was calculated as the period from when a patient approached the dispensary window to receive his /her drugs to when the patient leaves the window. The waiting time before the patient hands the prescription in to be filled is not counted. Dispensing time was obtained in the middle of a clinic day.<sup>(6)</sup>

The following data was calculated:

- Average consultation time
- Average dispensing time
- Percentage of drugs actually dispensed
- Percentage of drugs actually labelled
- Percentage of adequate patient's knowledge

**C- Health facility indicators:** An observational checklist based on WHO/INRUD drug use indicators

was utilized to assess drug use health facility indicators.<sup>(6)</sup> All pharmacies in the selected FHF were checked for health facility indicators.

The following data were calculated:

- Percentage of available copy of EDL.
- Percentage of available key drugs.

**Index of rational drug use:** Zhang and Zhi developed an index system for comprehensive appraisal of medical care.<sup>(9-10)</sup> The following indices were selected to be calculated in the present study by applying Zhang and Zhi mathematical model:

- Index of Rational Drug Prescribing (IRDP).
- Index of Rational Patient Care Drug Use (IRPCDU).
- Index of Rational Facility Specific Drug Use (IRFSDU).
- Grand total Index of Rational Drug Use (IRDU)

The optimal index for prescribing, patient care and health facility indicators were set as 1. The values closer to 1 indicate rational drug use and vice versa.<sup>(9-10)</sup> As regards prescribing indices, calculation of prescribed medications, antibiotic prescription and injection prescription indices, the following formula was used:

$$\text{Index} = \frac{\text{optimal value}_{(10)}}{\text{observed value}}$$

All other prescribing indices (generic name index, prescribing from EDL index), patient care indices (consultation time index, dispensing time index, drugs actually dispensed index, labelling of drugs index, patients' knowledge index) and health facility indices (EDL availability index, key drugs availability index) were calculated by the following formula:

$$\text{Index} = \frac{\text{observed value}_{(10)}}{\text{optimal value}}$$

Optimal values for WHO/INRUD drug use prescribing, patient care and health facility indicators were adopted from values suggested by WHO in 'Guide to drug financing mechanisms'.<sup>(11)</sup> However, no values were recommended for the optimal duration of consultations or dispensing, so the mean of optimal values suggested in previous studies were calculated and adopted.<sup>(12, 13)</sup> The total Index of Rational Drug Prescribing (IRDP) was calculated out of 5 for each FHF by adding the indices values of all prescribing indicators. In a similar way, the total Index of Rational Patient-Care Drug Use (IRPCDU) and the total Index of Rational Facility-Specific Drug Use (IRFSDU) were calculated out of (5 and 2 respectively). Finally, the grand total Index of Rational Drug Use (IRDU) was calculated for each FHF by adding up the total of IRDP, IRPCDU and IRFSDU out of 12.<sup>(10, 12)</sup>

### Statistical Analysis

Data were reviewed, coded, verified and statistically analyzed using the statistical package SPSS version 20.<sup>(14)</sup> All variables were described by mean as a

measure of central tendency and standard deviation as a measure of dispersion, and drug use indices were calculated.

### Ethical Considerations

The study was approved by the institutional review board and the ethics committee of High Institute of Public Health, Alexandria University. The study conformed to the principles of Helsinki declaration and the international ethics guidelines. A written permission from the Ministry of Health and Population was obtained to carry out the study after being approved from its ethical committee. Verbal consent was taken from the patients and pharmacists to participate in the study after explanation of the purpose and benefits of the study. Anonymity and confidentiality of the data was assured.

## RESULTS

Table 1 shows WHO/INRUD drug use indicators at the studied FHF's in Alexandria, 2016/2017. Concerning

prescribing indicators, the average number of drugs per encounter was  $3.2 \pm 1.4$ , in comparison to the optimal value  $< 2$ . The mean % of drugs prescribed by generic name was  $80.6 \pm 31.1$ . Meanwhile, the mean % of encounters with an antibiotic prescribed was  $36.0 \pm 48.04$  (optimal value  $< 30\%$ ). The mean % of encounters with an injection prescribed was  $20.7 \pm 40.5$  (optimal value  $< 20\%$ ). The mean % of drugs prescribed from EDL was  $81.2 \pm 23.6$ . Regarding patient care indicators, the mean consultation time was  $5.7 \pm 2.9$  minutes, in comparison to the optimal value  $\geq 20$  minutes. The mean dispensing time was  $157.1 \pm 166.9$  seconds (optimal value  $\geq 120$  seconds). The mean % of drugs actually dispensed was  $87.3 \pm 19.6$ , while none of the dispensed drugs were adequately labelled. The mean % of adequate patients' knowledge was  $56.0 \pm 49.7$ . As regards health facility indicators, a copy of EDL was available in all health facilities, while the mean % of availability of key drugs in stock was  $66.3 \pm 47.6$ . Accordingly, consultation time, drug labelling, patients' knowledge and availability of key drugs in stock were far from optimal.

**Table 1: Drug use indicators at the studied family health facilities in Alexandria, 2016/2017**

Drug use indicators	Overall results (mean $\pm$ SD)	n	Optimal value
<b>Prescribing indicators</b>			
1. Average no. of drugs per encounter	$3.2 \pm 1.4$	600	$< 2$
2. % of drugs prescribed by generic name	$80.6 \pm 31.1$	600	100
3. % of encounters with an antibiotic prescribed	$36.0 \pm 48.04$	600	$< 30$
4. % of encounters with an injection prescribed	$20.7 \pm 40.5$	600	$< 20$
5. % of drugs prescribed from EDL	$81.2 \pm 23.6$	600	100
<b>Patient care indicators</b>			
1. Average consultation time (min.)	$5.7 \pm 2.9$	240	$\geq 20$
2. Average dispensing time (sec.)	$157.1 \pm 166.9$	240	$\geq 120$
3. % of drugs actually dispensed	$87.3 \pm 19.6$	600	100
4. % of drugs adequately labelled	$0.0 \pm 0.0$	600	100
5. % of adequate patients' knowledge	$56.0 \pm 49.7$	600	100
<b>Health facility indicators</b>			
1. % of availability of a copy of EDL	$100 \pm 0$	8	100
2. % of availability of key drugs in stock	$66.3 \pm 47.6$	8	100

Table 2 represents the indices of rational drug use at the studied FHF's in Alexandria, 2016/2017. The total average Grand total (IRDU) index for the eight studied FHF's was 8.06 out of 12. The highest achieved index was 9.03 and the lowest was 7.27. The total average Index of Rational Drug Prescribing (IRDP) index was 3.9 out of 5 with a minimum of 3.17 and a maximum of 4.5. Four FHF's reached the optimal index for antibiotic prescription. Similarly, four FHF's reached the optimal index of injection's prescription. Meanwhile, only one FHF did not reach 50% of the optimal index for each of them. Also, one health facility reached only 50% of optimal index for medication prescription. As regards patient care indicators, the total average IRPCDU index for all FHF's was 2.5 out of 5. The highest FHF index

was 2.97 while the lowest was 2.06. The main defects were in consultation time and labelled drugs indices. The highest consultation time index was 0.37 with a total average consultation time index of all FHF's 0.26. Four FHF's reached the optimal index for dispensing time meanwhile 2 FHF's didn't achieve 50% of the optimal index. The labelled drugs index was unsatisfactory in all health facilities. Two FHF's got less than 50% of the optimal index for patient's knowledge. The total average Index of Rational Facility-Specific Drug Use (IRFSDU) index was 1.66 out of 2, while the highest was 1.9 and the lowest was 1.5. EDL was available in all health facilities, while 2 health facilities reached only 50% of the optimal index for availability of key drugs.

**Table 2: Indices of rational drug use at the studied family health facilities in Alexandria, 2016/2017**

Indices of Rational drug use (IRDU)	FHF (1)	FHF (2)	FHF (3)	FHF (4)	FHF (5)	FHF (6)	FHF (7)	FHF (8)	Optimal Index	Total Average
<b>Prescribing indicators</b>										
1- Prescribed medication index	0.66	0.5	0.76	0.59	0.51	0.56	0.66	0.66	1	0.61
2- Generic name index	0.81	0.62	0.92	0.71	0.89	0.85	0.8	0.84	1	0.8
3- Antibiotic's prescription index	1	0.75	1	0.41	1	0.75	0.97	1	1	0.86
4- Injection's prescription index	0.99	0.51	1	1	0.45	0.83	1	1	1	0.85
5- EDL index	0.91	0.79	0.82	0.82	0.85	0.79	0.74	0.78	1	0.81
Index of Rational Drug Prescribing (IRDP)	4.37	3.17	4.5	3.53	3.7	3.78	4.17	4.28	5	3.9
<b>Patient care indicators</b>										
1- Consultation time index	0.32	0.29	0.37	0.195	0.24	0.37	0.304	0.22	1	0.29
2- Dispensing time index	1	1	0.702	0.79	1	1	0.313	0.46	1	0.78
3- Dispensed drugs index	0.86	0.86	0.92	0.86	0.87	0.84	0.87	0.91	1	0.87
4- Labelled drugs index	0	0	0	0	0	0	0	0	1	0
5- Patient's knowledge index	0.63	0.41	0.64	0.29	0.55	0.76	0.57	0.63	1	0.56
Index of Rational Patient Care Drug Use (IRPCDU)	2.81	2.56	2.63	2.14	2.66	2.97	2.06	2.22	5	2.5
<b>Health Facility indicators</b>										
1- Available EDL index	1	1	1	1	1	1	1	1	1	1
2- Available key drugs index	0.8	0.8	0.9	0.6	0.5	0.6	0.6	0.5	1	0.66
Index of Rational Facility- Specific Drug Use (IRFSDU)	1.8	1.8	1.9	1.6	1.5	1.6	1.6	1.5	2	1.66
<b>Grand total IRDU</b>	<b>8.98</b>	<b>7.53</b>	<b>9.03</b>	<b>7.27</b>	<b>7.86</b>	<b>8.35</b>	<b>7.83</b>	<b>8</b>	<b>12</b>	<b>8.06</b>

## DISCUSSION

WHO prescribing, patient care and health facility drug-use indicators are now widely accepted as a global standard for problem identification and have been used in over 30 developing countries and can be used for supervision purposes.<sup>(15)</sup> In many countries self-monitoring with basic rational drug-use indicators in individual health centers and at district level has been proved to be very effective in improving drug use.<sup>(16)</sup>

The present study showed that the average number of drugs prescribed per encounter was (3.2) which is higher than recommended optimal value (<2 drugs). The study value is higher than that previously reported in other PHC centers in Alexandria (2.5)<sup>(12)</sup>, African region (2.6)<sup>(17)</sup> and Kuwait (2.9)<sup>(18)</sup>. Our reported value is probably due to the policy ruling the number of prescribed medications for chronic cases in the FHF, which limits the maximum number of drugs prescribed in a single prescription to 3 drugs. In order to fully benefit of the clinic visit's cost, chronic cases sometimes urge their physicians to prescribe them all three drugs allowed, moreover other cases purchase 2 prescription forms to get the allowed 6 medications in lowered prices. The WHO recommends generic prescribing as a safety measure for clear identification and dispensing of medications to patients, and for easy communication and exchange of information among health professionals.<sup>(19)</sup> The percentage of drugs prescribed by generic name in the present study was (80.6%) that is lower than the recommended optimal

value of 100%. This value is consistent with that previously reported by Alkot in Egypt (86.4%).<sup>(20)</sup> Low prescribing in generic name was also reported in some PHC centers in African region(68.9%)<sup>(17)</sup>, Saudi Arabia(61.2%)<sup>(21)</sup> and India(34.97%).<sup>(22)</sup> Although, most drugs are written in generic names in the EDLs of the studied FHF, prescribing in trade names is practiced by physicians due to effective drug promotional activities that target physicians. Therefore, educational programs on prescribing generic drugs are needed.<sup>(23)</sup> Overuse of antibiotics with no evidence based indication can lead to drug resistance.<sup>(24)</sup> Lack of in-service training contributes to poor prescribing practices as demonstrated by one study in Ghana in which antibiotics were prescribed for (60%) of patients.<sup>(25)</sup> The present study showed that the percentage of encounters with an antibiotic prescribed was (36%) that outnumbered the recommended optimal value of less than 30%. This value is consistent with that previously reported by Alkot in Egypt (35.3%)<sup>(20)</sup>. High values were also reported in some PHC centers in Saudi Arabia (32.2%)<sup>(21)</sup> and Kuwait (39.1%)<sup>(18)</sup> In Yemen, a descriptive cross-sectional survey to assess prescribing practices, was carried out in hospitals, health centers and units from different areas of Hadramout governorate, where (66.2%) of prescriptions contained antibiotics.<sup>(26)</sup> The higher value reported in our study was due to insufficient knowledge about appropriate antibiotic use and lack of physician training. Some antibiotics were prescribed inappropriately, to manage illnesses, such as diarrhea,

which don't always require antibiotic use. Patient pressure on physicians to prescribe an antibiotic may also contribute to the high percentage.

The present study revealed that the percentage of encounters with an injection prescribed was (20.7%) which had slightly exceeded the recommended optimal value of (<20%). This was higher than what was previously reported in other PHC centers in Alexandria (9.9%).<sup>(12)</sup> Also, a high percentage of injection prescription was reported in some PHC centers of the African region (25.6 %).<sup>(17)</sup> The current value was higher than what was reported in PHC centers in Kuwait (9.1%)<sup>(18)</sup> and Bahrain (8.3%).<sup>(27)</sup>

The WHO recommends prescribing drugs from the EDL as those are older drugs, already tested in practice, with established clinical use, and of lower cost than newer drugs.<sup>(28)</sup> The recommended optimal value for the percentage of drugs prescribed from EDL is 100%, this percentage is used to assess to what extent current practices conform to a national drug policy.<sup>(6)</sup> In this study, the percentage of drugs prescribed from EDL was (81.2%), while Akl et al., (2010) found that the percentage in other PHC centers in Alexandria was (95.4%).<sup>(12)</sup> A study in India showed that only (58.94%) of prescribed drugs were from EDL<sup>(22)</sup>, however the percentages were nearly optimal in some PHC centers in Bahrain (99.8%)<sup>(29)</sup>, Saudi Arabia (99.2%)<sup>(21)</sup>, and Palestine (97.9%).<sup>(30)</sup>

The present study assessed physicians' prescribing against the local EDLs of each FHF. Some medications were removed from the local EDLs due to constant deficient supply. However, the same medications were still supplied in the other FHC/Us. Besides, some non-EDL medications were frequently prescribed by physicians, which may point out to the need of revising and updating the national EDL. Efficient consultation must include complete patient evaluation, providing the patient with the necessary information regarding his/her condition and instructions related to the prescribed drugs.<sup>(18)</sup> In this study, the average consultation time was (5.7 minutes), which is shorter than what Akl et al., previously reported in other PHC centers in Alexandria (7.1 minutes).<sup>(12)</sup> The present value is considered low compared to the recommended optimal value ( $\geq 20$  minutes). Short consultation times were also reported in some PHC centers in Jordan (3.9 minutes)<sup>(31)</sup> and Kuwait (2.8 minutes).<sup>(18)</sup> The current low value is due to high patient/physician ratio during midday causing overload on physicians; also it was obvious that general practitioners working in FHF's don't have enough knowledge on how to conduct efficient consultation sessions for every patient to ensure proper history taking, diagnosis and prescribing. This can be attributed to lack of training of the newly graduated physicians and general practitioners working in FHF's.

The present study showed that the average dispensing time was (157.1 seconds), this value had

properly reached the recommended optimal value of ( $\geq 120$  seconds). Also, it is much longer than what previously reported in other PHC centers in Alexandria (47.4 seconds)<sup>(12)</sup> and Kuwait (54.6 seconds).<sup>(18)</sup> Long dispensing times were also reported in a secondary care referral hospital in India (240 seconds)<sup>(32)</sup> and some PHC centers in Cambodia (235.2 seconds).<sup>(33)</sup> Although, the value of dispensing time seems appropriate and long enough for proper counseling of patients, most of it was spent by pharmacists in preparing medications and calculating medications' prices, while the actual time specified for instructing patients about doses and precautions was too short. In some settings, pharmacists faced patients overcrowding at the dispensary window during midday, with only one outlet window for dispensing, which led to prolongation of dispensing time, pharmacists' frustration and patients' dissatisfaction. The percentage of drugs actually dispensed in this study was (87.3%) which is less than the recommended optimal value of (100%). However, higher value (95.9%) was previously reported in some PHC centers in Alexandria.<sup>(115)</sup> Near optimal values were reported in PHC centers in Kuwait (97.9%)<sup>(18)</sup> and Saudi Arabia (99.6%)<sup>(34)</sup>, meanwhile low value (86%) was reported in a tertiary care hospital in Ethiopia.<sup>(13)</sup> The low percentage reported in the current study was due to unavailability of some essential drugs in stocks. Also, lack of reporting of daily update of the available drugs to physicians, made them prescribe unavailable EDL's drugs to patients. In this situation, patients either left without the prescribed drugs or returned to the physician to prescribe an alternative, which lead to consuming physician's time and effort and it also affected smooth patients' flow. Although, some medications were dispensed in lower amount than prescribed due to stock shortage, they were considered actually dispensed.

The availability of essential drugs in the healthcare facilities is one indicator for quality of care. High level of stock out medications has a negative impact on patient confidence in the health care system and force patients to purchase essential drugs at high price from private outlets.<sup>(13)</sup> The present study showed that none of the dispensed drugs were labelled adequately. This was consistent with what was previously reported by Akl et al., (2010) in a study conducted in 10 PHC centers in Alexandria.<sup>(12)</sup> In 2012, El Mahalli et al., conducted a study to assess patient care indicators at 10 PHC centers in eastern province in Saudi Arabia. It was reported that adequate drugs' labelling ranged widely from (0 to 100%) among different PHC centers.<sup>(34)</sup> In all FHF's pharmacies, one pharmacist usually dispensed drugs to one patient with no cooperation from other pharmacists; this made adequate labelling of drugs impossible especially in high attendance rate FHC/Us. In some FHF's with low attendance rate,

pharmacists didn't label the drugs adequately, although they had enough time to do so.

The present study showed that the percentage of adequate patient's knowledge was (56.0 %). Short consultation time, spending most of dispensing time in preparing and calculating drugs' prices and inadequate drug's labelling had contributed to the low percentage of adequate patient's knowledge. Comparable to our results, Atif et al., (2016)<sup>(10)</sup> assessed 600 patients' knowledge in out-patients clinics of two hospitals in Pakistan (knowledge about when and in what quantity the medicine should be taken), they reported adequate knowledge in (61.6 %) of patients. In another study in PHC centers in Kuwait, the percentage of adequate patient's knowledge was found to be (26.9%), where the researcher evaluated patients' knowledge in relation to indication, quantity to be taken, when it should be taken, and duration of use for each drug. However, in the same study, the percentage of knowledge of correct dosage alone was (66.4%).<sup>(18)</sup>

As regards health facility indicators, all the studied FHF's had their own EDLs and that was higher than what Akl et al., (2010) reported in Alexandria where 8 out of 10 PHC centers had EDLs<sup>(12)</sup>, while in Saudi Arabia 9 out of 10 PHC centers had EDLs.<sup>(34)</sup> Adopting a list of essential drugs leads to better supply, avoiding irrational treatment alternatives, focused patient's education efforts and lower costs.<sup>(35)</sup> The present study showed that the percentage of available key drugs in stock was (66.3%). In 2011, comparable low value (59.2%) was also reported in some PHC centers in Saudi Arabia.<sup>(34)</sup> Limited availability of key drugs might be associated with budgetary constraints and inadequate drug supply system.<sup>(36)</sup>

The highest Grand total IRDU in the present study was 9.03 out of 12, while the lowest was 7.27 compared to 9.51 and 8.08 respectively in FHF's in Alexandria in 2010.<sup>(12)</sup> Meanwhile, the highest IRDP reached (4.5) compared to (4.88) in FHF's in Akl et al., study and (4.27) in PHC centers in Pakistan in 2016.<sup>(12, 36)</sup> In the present study, no FHF reached the optimal index of prescribed medications. However, in Akl et al., study in Alexandria (2010), 80% of the studied facilities reached the optimal index. This dramatic change was due to different adopted optimal values for prescribed medication index, which was ( $\leq 3$  medications) in Akl et al., study versus ( $< 2$  medications) in this study.<sup>(12)</sup>

As regards antibiotic's prescription index, 50% of the studied FHF's reached the optimal index compared to 30% in Alexandria (2010).<sup>(12)</sup> This may point out to improved antibiotics prescribing practices. Also, in the present study 50% of the FHF's reached optimal index in injection's prescription, however in Alexandria (2010) although the optimal value adopted was lower than ours ( $\leq 10\%$ ), 60% of the FHF's managed to reach it.<sup>(12)</sup> In the present study, the total average IRPCDU index of all studied FHF's was 2.5 out of 5 and the main

cause of this low value was the defect in consultation time index, labelled drug index and to lesser extent patients' knowledge index. Those results are comparable with Akl et al.,<sup>(12)</sup> except in the last cause as in 2010 all the studied FHF's had satisfactory patient knowledge index while in 2017 20% of the FHF's got less than 50% of the optimal index with a maximum of 0.76 index. In 2010<sup>(12)</sup>, 20% of the studied FHF's didn't achieve 50% of the optimal IRFSDU mainly as a result of defect in index of EDL. Meanwhile, in the current study, all the studied FHF's exceeded 50% of the optimal IRFSDU index in spite that 20% of them only reached half of the optimal index for availability of key drugs.

## CONCLUSION AND RECOMMENDATIONS

From our study for assessing drug use in family health facilities in Alexandria governorate, we may conclude that patient care indicators were the most deficient among drug use indicators, especially labelling of drugs, consultation time and patients' knowledge, in addition to availability of key drugs in stock. Thus, rational drug prescribing in family practice should be included in the national practice guidelines for family physicians. Pharmacists should be encouraged for proper labelling of drugs. Moreover, we may recommend that consultation time should be longer to be sufficient for providing proper patient care.

*Conflict of Interest:* None to declare

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