Original Article

Cross-Sectional Pilot Study to Monitor the Availability, Dispensed Prices, and Affordability of Opioids Around the Globe

Liliana De Lima, MHA, Tania Pastrana, MD, Lukas Radbruch, MD, and Roberto Wenk, MD

International Association for Hospice and Palliative Care (L.D.L., L.R., R.W.), Houston, Texas, USA; Department of Palliative Medicine (T.P.), RWTH Aachen University, Aachen, Germany; Department of Palliative Medicine (L.R.), University Hospital Bonn, and Centre for Palliative Medicine (L.R.), Malteser Hospital Seliger Gerhard Bonn / Rhein-Sieg, Bonn, Germany; and Fundacion FEMEBA (PAMP-FF) (R.W.), La Plata, Argentina

Abstract

Context. Opioids are essential medicines. The World Health Organization and Health Action International monitor the price of essential medicines. However, their surveys do not include opioids, and there is no information on their affordability.

Objectives. To provide information on access to pain treatment, as measured by the availability and dispensed price of five opioids in 13 formulations, and the affordability of oral immediate-release (IR) morphine.

Methods. The International Association for Hospice and Palliative Care members were distributed by their countries' Gross National Income (GNI) level using the World Bank categories, i.e., high income country (HIC), upper middle income country (UMIC), lower middle income country (LMIC), low income country (LIC), and randomized. A total of 10 participants were selected from each ($n = 40$) domain. Participants were asked to identify a pharmacy located closest to a public facility that provides diagnosis/treatment for life-threatening conditions and report the lowest dispensed price of the smallest selling unit and strength of each formulation. Availability and median (Me) price were calculated for each. Affordability and percentage of international buyer price (IBP) were calculated for morphine oral solid IR.

Results. A total of 30 participants from 26 countries (response rate = 75%) responded. Significant correlation was found between availability and GNI (range: 65–68% [HIC and LIC]; $R = 0.781$; $P < 0.0001$). Injectable and morphine oral solid sustained release (SR) were the most available (59% and 55%). Methadone (oral) was the least expensive (Me = 0.5) followed by fentanyl (transdermal; Me = 2.2). The Me price for morphine oral solid IR and ratios between dispensed and IBP were lower in HIC than in LMIC (price = 0.03 vs.

Address correspondence to: Liliana De Lima, MHA, International Association for Hospice and Palliative Care, 5535 Memorial Drive, Suite F—PMB 509, Houston, TX 77007, USA. E-mail: ldelima@iahpc.com

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0.16; ratio = 2.23 vs. 0.03). Affordability for morphine oral solid IR was five days (Me = 0.1; range = 29–0.25).

Conclusion. Patients in LMIC and LIC have limited access to opioids, and there are subsidies in place for more expensive medications and formulations in all GNI levels, but not for morphine oral solid IR. Additional research is necessary to identify the reasons behind these findings. J Pain Symptom Manage 2014;48:649–659.

Key Words
Essential medicines, opioids, availability, accessibility, affordability

Introduction

The World Health Organization (WHO) recognizes palliative care and pain relief as critical public health issues.[1–3] Strong opioids are a cornerstone of pain treatment, of which morphine is considered essential by the WHO.[4] In 2007, the International Association for Hospice and Palliative Care (IAHPC) developed a list of Essential Medicines (EMLs) in Palliative Care,[5] which includes opioids for the treatment of pain and other symptoms. Still, in many countries, limited or no access is a significant problem. Developing countries with about 80% of the world population account for 6% of the global morphine consumption[3] resulting in millions of patients suffering needlessly.

Access to opioids is limited owing to several reasons, including restrictive drug control laws and regulations, lack of education, and high prices.[6,7] In developing countries, they have been reported to be more expensive than in developed nations,[8–11] and prices in small cities and rural areas are higher than in large cities.[12] Opioid pricing is impacted by additional factors, such as markups resulting from safety and security measures required by the national laws on the manufacturing, importation, distribution, storage, and dispensation of controlled medicines. Pricing is also affected by the type of formulation, namely complex delivery mechanisms, such as transdermal patches (TPs); transmucosal or SR formulations are costlier to make than immediate release (IR) oral formulations (solid or liquid).

The WHO and Health Action International (HAI) developed a method to monitor and report the price of essential medicines as a measure of access,[13] which has prompted some governments to lower the cost of medicines.[14] However, with one exception,[15] the WHO/HAI surveys do not include opioids, and there is limited information on their price and affordability. In 2008, the IAHPC decided to develop the Opioid Price Watch (OPW) Project as a component of the agreement of work as a nongovernmental organization in formal relations with the WHO. This article describes the pilot study implemented to test the OPW.

Objectives

The objectives of the article are to:

1. Provide information on opioid availability globally;
2. Show opioid price patterns among regions and countries, as reflected in differences in treatment costs, affordability, and differences in prices as a ratio of the international reference price; and
3. Allow further analysis of the difficulties in availability and affordability of opioid analgesics and suggest possible strategies addressing the identified problems.

Methods

The study design was a cross-sectional study.[16] The project proposal is available on the IAHPC web site in http://hospicecare.com/resources/opioid-price-watch/. An ethics review board from the Fundacion Federacion Medica de Buenos Aires in Argentina approved the study.

The opioids were selected using the following criteria:

1. Included in the 17th edition of the WHO Model EMLs[4]
2. Included in the IAHPC EML but not included in the WHO EML[5]

The following medications and formulations were selected.

1. Fentanyl TPs
2. Hydromorphone (injectable, oral liquid, oral solid IR, and oral solid SR)
3. Methadone (oral liquid and oral solid)
4. Morphine (injectable, oral liquid, and oral solid [IR and SR])
5. Oxycodone (oral solid IR and SR)

All member states of the United Nations report consumption of these medications to the International Narcotics Control Board.[17]

The study sample was selected using the IAHPC members' list following a stratified random sampling:

1. The IAHPC members were listed by country in alphabetical order.
2. Countries were stratified by their Gross National Income (GNI) using the World Bank categories: low income countries (LICs), low middle income countries (LMICs), upper middle income countries (UMICs), and high income countries (HICs).[18]
3. The IAHPC members were listed by their corresponding country's GNI and each list was randomized.[19]
4. The first 10 participants in each category were selected, resulting in 40 potential participants.

Selected individuals were contacted by e-mail and invited to participate. Whenever one declined the invitation or if he/she did not reply, the next individual in the list was invited.

Participants were informed of the objectives of the study, total estimated time to complete the survey, that their names would be acknowledged, and that the data presented would be linked to their countries. A signed informed consent was submitted by all before completing the survey. Participants were asked to select the pharmacy located closest to a public health facility that provides diagnostic and treatment services for patients with life-threatening conditions. They were asked to speak to the chief pharmacist. A letter describing the project and identifying them as participants of the study was shown to the pharmacist. Participants were instructed to inquire if at least one of the opioids included in the study was available and dispensed for ambulatory patients. If opioids were not available or the pharmacist was unwilling to cooperate, they were asked to go to the next nearest pharmacy and to continue this process until they located one pharmacy that had at least one opioid available and where the chief pharmacist was willing to collaborate. Participants were asked to record in their local currency the lowest retail dispensed price of the smallest selling dose and unit for the opioid formulations available on the day they completed the survey. The address of the surveyed pharmacy was also recorded to avoid potential duplication. The Appendix (available at jpsmjournal.com) includes a sample of the survey form. The completed survey was submitted via the IAHPC server http://hospicecare.com/opioids/reports/add. Data were collected from September 2012 to April 2013. Prices were converted to U.S. Dollars (USD) using Google Finance Converter.[20] Survey results were exported to Microsoft Excel and IBM SPSS Statistics 21.

Definitions

The following definitions were applied in the study:[13]

Accessibility: The extent that patients can obtain the opioid medications they need for pain relief—patient access is not possible unless opioids are available and affordable.

Affordability: Total number of days required by a patient earning the minimum wage to purchase a 30-day treatment of medications at the dispensed price.[21]

Availability: Existence of the opioid medication in stock at the pharmacy to be dispensed to patients arriving at the pharmacy with a legitimate medical prescription. It was calculated by the percentage of opioids available at the moment the survey was completed, with 13 being the maximum number of formulations. The amount of pharmacies visited before finding one that had any of the opioids included in the study was recorded.

Dispensed Price: Pharmacy selling price plus any fees and any sales taxes. Dispensed price for a 30-day treatment for each medication was calculated by dividing the price of the package/bottle by the total milligrams in each, and then multiplying the resulting price per milligram by the corresponding monthly

treatment of the Defined Daily Dose (DDD;[13] Table 1). The DDD is the average maintenance dose per day for a drug used for its main indication in adults established by the WHO Collaborating Center for Drug Statistics Methodology.[22,23] The DDD is a quantitative measure for statistical purposes only and not to be used as a treatment guideline.

Median (Me) Price: The middle value in a distribution, above and below which lie an equal number of the highest and lowest prices recorded for each medication.

Median Price Ratio (MPR): Difference between the reported dispensed price and the international buyer reference price given by the International Drug Price Indicator Guide.[24]

Data Analysis

This article presents results and analysis of the following data:

1. For five opioids in 13 formulations: availability, dispensed price of lowest dosage available, and Me price of each.
2. For morphine oral solid IR: In addition to the Dispensed price, the MPR and Affordability were also calculated for this medication and formulation. The reason is that morphine oral solid IR has been used as a reference for monitoring consumption of opioids, and it is included as the gold standard essential strong analgesic in the WHO Model EMLs.[4]

A descriptive analysis of the data and a comparative analysis by GNI region were conducted. Given the sample size, Spearman's rank correlation coefficients (Rs) and Kruskal-Wallis tests were used when applicable.

Table 1
Amount Needed for a 30-Day Treatment for Each Medication

Medication—Formulation	DDD (mg)	30-Day Treatment (DDD × 30)[21]
Fentanyl—transdermal	0.0012	36
Hydromorphone—oral	20	600
Hydromorphone—injectable	4	120
Morphine—oral (IR and SR)	100	3000
Morphine—injectable	30	900
Oxycodone—oral	75	2250
Methadone—oral[a]	20	600

DDD = Defined Daily Dose; IR = immediate release; SR = sustained release.
[a]Given that there is no identified DDD for pain treatment with methadone, a morphine equivalent dose was defined as 1:5 based on the published literature:[22] (100 mg/5 = 20 mg).

Results

Data were submitted by 30 participants from 26 countries (75% response rate). Participants are listed in the Acknowledgment section. Reports were submitted from two locations in two countries, namely China (Beijing and Chengdu) and the U.K. (Edinburgh and Leeds); whereas reports from three locations were submitted from Tanzania (two in Arusha and one in Dar es Salaam). Reports from Arusha (Arusha 1 and 2) were the same for availability and prices. In Chile and Poland, the survey was submitted by the invited participant and an additional collaborator, not included in the response rate but listed in the Acknowledgment section.

Availability

The average number of pharmacies visited before finding the one that had at least one of the opioids included in the study varied by GNI: HIC: 1 (range = 0−1, Me = 0.6), UMIC: 1 (range = 0−2, Me = 1), LMIC: 9 (range = 1−40, Me = 2.5), and LIC: 4.5 (range = 3−15, Me = 6.1). In Moldova, Nepal, and Sudan, opioids are available only in hospital pharmacies allowed to dispense for nonhospitalized patients.

Availability of opioid formulations ranged from 11 (85%) in Norway to 0 in Kenya, Nigeria, Tanzania (Dar es Salaam), and Uganda. In five locations (Bangladesh, Brazil, Ethiopia, Tanzania [Arusha 1 and 2], and Uruguay), only one opioid was available, followed by Moldova with two. Norway had the highest number available,[11] followed by Germany, New Zealand, and Spain.[9]

The mean percentage of medications available is strongly related to GNI level, ranging from 65% to 8% (HIC and LIC, respectively; Table 2). A significant positive correlation between the country's GNI and the availability of opioids was found ($Rs = 0.781$; $P < 0.0001$). In all HIC, availability was higher than 50%, with the exception of Poland (46%). Brazil and Uruguay had the lowest availability in the UMIC group (8%), whereas

the highest availability was in China (Chengdu) and Romania (almost 50%). The extremes of the LMIC groups were Guatemala and Nigeria (62% and 0%, respectively). Nepal stands out in the LIC group with 31% of the medications available.

Injectable morphine (ampoule) was the most available (58%, $n = 17$), followed by morphine oral solid SR (53%, $n = 16$), then by morphine oral solid IR, fentanyl TP, and oxycodone SR (47%, $n = 14$). Morphine ampoule was available in three of the LIC (Bangladesh, Ethiopia, and Nepal), whereas morphine liquid was available in Nepal and Tanzania (Arusha 1 and 2). No opioids were available in Kenya, Nigeria, Tanzania (Dar es Salaam), or Uganda, but none reported that the opioids were never available. Hydromorphone was the least available of all: liquid (none), ampoule (China [Beijing]), IR solid (Norway and China [Beijing]), and SR solid (Germany, Norway, and Spain).

Dispensed Prices

Opioids are dispensed free in Chile, Moldova, Nepal, New Zealand, Russia, Sudan, and Tanzania (Arusha 1 and 2). In Edinburgh, opioids are free, but not in Leeds (U.K.). In Germany, medications are dispensed at no cost to the patients through a health insurance fund, but patients are required to pay a fixed dispensing fee.

The Me price for morphine oral solid IR 10 mg ranged between USD 0.03 and 0.16 for HIC and LMIC, respectively, whereas the MPR ranged between USD 0.06 and 0.33 in HIC and LMIC, respectively (Table 3). Table 4 describes the Me price comparison of a 30-day treatment by GNI. The Me price of 30-day treatment of morphine oral solid IR 10 mg was less in HIC (USD 4.6) than in lower GNI groups (UMC = 30.5 and LM = 46.8). Apart from morphine liquid, which is free in seven of 13 countries (Me = 0), methadone oral solid was the lowest-priced medicine (Me = 0.5), followed by fentanyl TP (Me = 2.2). Synthetic opioids and in some cases opioids with more complex delivery mechanisms (TP and oral SR) were dispensed at lower prices than morphine oral solid IR. Fentanyl TP is free in Chile, Iran, New Zealand, Romania, and Russia

Table 2
Availability of Opioids by Income Groups

Income Group (GNI)	Mean Percent[a]	Country (City)	% Of Opioids Available
HIC	64.8	Norway (Bergen)	84.62
		Germany (Aachen)	69.23
		New Zealand (Wellington)	69.23
		Spain (Pamplona)	69.23
		U.K. (Leeds)	61.54
		U.K. (Edinburgh)	53.84
		Poland (Poznan)	46.15
UMIC	29.1	China (Chengdu)	46.15
		Romania (Brasov)	46.15
		Chile (Santiago)	38.46
		Iran (Teheran)	38.46
		Argentina (San Nicolas)	30.77
		China (Beijing)	23.08
		Russia (Kemerovo)	23.08
		Brazil (Rio de Janeiro)	7.69
		Uruguay (Montevideo)	7.69
LMIC	28.2	Guatemala (Guatemala City)	61.54
		Philippines (Iloilo City)	38.46
		India (New Delhi)	30.77
		Sudan (Khartoum)	23.08
		Moldova (Chisinau)	15.38 Nigeria (Ibadan)
LIC	7.7	Nepal (Bharatpur)	30.77 Bangladesh (Dhaka)
		Ethiopia (Hawassa)	7.69
		Tanzania (Arusha 1)	7.69
		Tanzania (Arusha 2)	7.69
		Tanzania (Dar es Salaam)	0
		Kenya (Nairobi)	0
		Uganda (Kampala)	0

GNI = Gross National Income; HIC = high income country; UMIC = upper middle income country; LMIC = lower middle income country; LIC = low income country.
[a]Spearman's rank correlation coefficient (Rs) = 0.781; $P < 0.0001$, Kruskal-Wallis tests $P < 0.0001$.

Table 3
Morphine Oral Solid, IR 10 mg Tablet—Median Price Per Unit and Median Price Ratio (MPR) by Income Groups

GNI Group	Median Price (10 mg), USD	MPR
HIC	0.03	0.06
UMIC	0.10	0.22
LMIC	0.16	0.33
LIC	—	—

GNI = Gross National Income; HIC = high income country; UMIC = upper middle income country; LMIC = lower middle income country; LIC = low income country.
MPR = difference between the reported dispensed price and the international buyer reference price. The 2011 international buyer reference price for morphine oral solid IR 10 mg tablet was USD 0.47.[24]

and the least expensive in Germany, Guatemala, India, Norway, Philippines, Poland, Spain, and the U.K. (Leeds). In general, it was found that if available, patients in LMIC are likely to pay more for the medication than patients in the other two groups. Hydromorphone oral solid IR was the most expensive formulation (Me = 228.5) followed by oxycodone (IR: Me = 144.1; SR: Me = 112.6).

Affordability

The mean number of days' wages required by the lowest-paid worker to purchase a 30-day treatment of morphine oral solid IR among the 14 countries that reported availability was five days (Me = 0.1; SD = 9.1), but varies greatly by country, ranging from: 29.48 (Philippines) and 20.75 (India) to 0.25 days (Spain). In five countries (Nepal, Sudan, Romania, New Zealand, and Poland), it is dispensed free to patients. The results indicate that morphine oral solid IR is less affordable in countries in lower income groups: LMIC (Me = 14.4; mean = 14.6 [SD = 13.1]), UMIC (Me = 2.2; mean = 2.7 [SD = 9.3]), and HIC (Me = 0.2 [SD = 0.36]; Table 5). In general, a negative correlation between the days' wages and the country income category ($R_S = 0.544$; not significant) was identified: the lower the income, the more working days required to pay for the treatment.

Discussion

This is the first pilot study that presents information on the differences among

Table 4
Median Price Comparison of One 30-Day Opioid Treatment By Income Groups

Medication	All (*n* = 26)		LIC (*n* = 8)		LMI (*n* = 6)		UMI (*n* = 9)		HIC (*n* = 7)	
	Free	Me USD	Free	Me USD	Free	Me USD	Free	Me USD	Free	Me USD
Morphine oral solid immediate release (tablet and capsule)	6/14	18.9	1/1	0.0	1/4	46.8	1/3	30.5	3/6	4.6
Morphine oral solid sustained release (tablet and capsule)	7/16	7.5	1/1	0.0	2/5	44.6	2/3	0.0	2/7	7.9
Morphine oral (liquid)	7/13	0.0	3/3	0.0	1/2	35.1	1/2	114.1	2/6	21.9
Morphine injectable (ampoule)	6/17	16.8	1/3	1.8	1/3	31.7	3/6	8.4	1/5	64.4
Fentanyl (transdermal patches)	5/14	2.2	—	—	0/3	27.6	4/5	0.0	1/6	2.2
Oxycodone oral immediate release (tablet and capsule)	3/11	144.1	—	—	0/2	525.4	0/3	200.5	3/6	70.9
Oxycodone oral slow release (tablet and capsule)	5/14	112.6	—	—	0/2	734.8	2/5	334.0	3/7	10.5
Methadone oral solid (tablet and capsule)	5/10	0.5	—	—	0/1	76.6	2/4	0.5	3/5	0.0
Methadone oral (liquid)	3/8	8.9	—	—	—	—	0/1	1.3	3/7	16.6
Hydromorphone oral immediate release (tablet and capsule)	0/2	228.5	—	—	—	—	0/1	10.5	0/1	446.5
Hydromorphone oral slow release (tablet and capsule)	1/3	97.7	—	—	—	—	—	—	1/3	97.7
Hydromorphone oral (liquid)	—	—	—	—	—	—	—	—	—	—
Hydromorphone injectable (ampoule)	0/1	5.2	—	—	—	—	0/1	5.2	—	—

UMIC = upper middle income country; LIC = low income country; LMIC = lower middle income country; HIC = high income country; Me = median; USD = U.S. Dollars.
Note: In column "Free" the nominator equals number of countries where medication is dispensed free, denominator equals number of countries where medication is available.

Table 5
Affordability for a 30 Day Treatment of Morphine Oral Solid IR by Income Group

GNI Group	Number of Days' Wages	Country	Number of Days' Wages
All	Me = 0.1	All countries	
	IQR = 6.9		
	$\bar{x}$ = 5·0		
	CI = 4.76		
HIC	Me = 0.0	U.K. (Leeds)	0.8
	IQR = 0.5	Spain	0.3
	$\bar{x}$ = 0.2	New Zealand	0.0
	CI = 0.32	Poland	0.0
		Norway	[a]
UMIC	Me = 2.2	Argentina	6.5
	IQR = 6.0	China (Chengdu)	4.5
	$\bar{x}$ = 2.7	Romania	0.0
	CI = 3.19		
LMIC	Me = 14.4	Philippines	29.5
	IQR = 25.3	India	20.8
	$\bar{x}$ = 14.6	Guatemala	8.1
	CI = 12.84	Sudan	0.0
LIC	Me = 0.0	Nepal	0.0
	IQR = 0.0		
	$\bar{x}$ = 0.0		
	CI = 0.0		

GNI = Gross National Income; Me = median; IQR = interquartile range; $\bar{x}$ = mean; CI = confidence interval; HIC = high income country; UMIC = upper middle income country; LMIC = lower middle income country; LIC = low income country; IR = immediate release.
[a]Morphine oral solid IR was available in Norway; however, it was not possible to determine the affordability given that there is no minimum wage in the country.

availability, prices, and affordability of opioids across the World Bank GNI groups in pharmacies close to a public health facility that provides diagnostic and treatment services for patients with life-threatening conditions such as HIV and cancer.

Availability

The information reflects opioid availability in a specific pharmacy on any given day, so no inferences regarding availability in the whole country are possible. Although results indicate that several opioids and formulations were not available at the time of the survey, it does not imply that these opioids are never available in such locations. None of the countries included in the study reported not having any opioids available at any time, which is an indication of progress.[7] The possibility of finding an opioid at the pharmacy is directly correlated to the country's GNI, which is consistent with opioid consumption reports published by the International Narcotics Control Board. The number of medications available in Guatemala was high compared with countries within the middle and low GNI, which may reflect recent efforts to improve availability to pain treatment in that country. Almost all the African countries registered very limited availability, with either none or one opioid available, with the exception of Sudan, which reported having three medications/formulations available. The participating African countries were LIC (Ethiopia, Kenya, Tanzania, and Uganda) or LMIC (Nigeria and Sudan). Recent efforts have been made to improve opioid availability in several African countries, so future OPW reports should reflect increased availability in these countries as well. As suggested by the WHO,[13] the availability of medications can be improved through adequate management and realistic assessment of local supply options and needs.

While this report was being prepared, the WHO published a new edition of the EML, which includes all the morphine formulations and lists oxycodone and hydromorphone as substitutes for morphine.[25]

The WHO Model List also includes a new section of medications for pain and other symptoms common in palliative care, which will hopefully result in increased awareness about the importance and relevance of having these medications available to relieve suffering of patients with life-threatening conditions.

Dispensed Prices

In regard to its international reference price (USD 0.47), the Me price of morphine oral solid IR (10 mg) is 5.8 times higher in LMIC than in HIC. In the former, the cost of additional burdens and requirements resulting from stringent norms and regulations may be transferred on to the patients, whereas in HIC, the costs tend to be covered through other funds and pooling of resources.[26]

Hydromorphone oral IR and oxycodone oral IR and SR were the highest dispensed price medications. However, in Iran and Norway, the dispensed price of oxycodone oral IR was lower than morphine injectable; and in Poland, the dispensed price of oxycodone oral SR was lower than methadone oral liquid. Results also show an unexpected favorable price difference for fentanyl TP: it is dispensed free in five

countries (1 HIC and 4 UMIC) and the cheapest opioid in seven, indicating that there could be heavy subsidies in place at all GNI levels. For example, morphine oral solid IR tablet was more expensive than fentanyl TP in China (Chengdu), Germany, Guatemala, India, Iran, Norway, Poland, Spain, the Philippines, and the U.K. It would be useful to find out the reasons why morphine is not included in subsidy programs, even in LMIC. Artificially lowering the dispensing price of the most expensive medications and formulations results in an economic disadvantage for morphine oral solid IR and probably also in less demand for this medication. Morphine oral IR is cheaper than other opioids,[10,27,28] so there may be insufficient margin to generate profit incentive for pharmaceutical companies to commercialize it. Although availability of several opioids and formulations is desirable, it is also critical to ensure access to morphine oral solid IR solid, which has been proven to be efficacious and safe for treatment of severe pain.[29]

Methadone (in both formulations) was priced lower than several morphine formulations in almost all the countries where available and the most consumed in China, Iran, New Zealand, Tanzania, and the U.K.[30] It is important to note that methadone is mostly used in substitution therapy for dependence syndrome, but its use as an analgesic has been increasing in palliative care.[31–33]

Affordability

New Zealand had the best affordability (nine medications/formulations available for free). Monthly treatment costs of morphine oral solid IR measured in the number of days' wages of the lowest-paid worker varies greatly (Philippines 29, India 21, and Guatemala 8 days). Many people in these countries earn less than the minimum wages used for this study (USD: 2.18, 4.85, and 8.16 per day respectively)[23] and live below the international poverty line of USD 1.25/day,[34] indicating that the number of working days needed to pay the cost of treatment may be higher than the results in this study and that pain treatment is accessible to only a few who can afford it.

Governments and policy makers need to take the necessary steps to ensure that the patients are able to receive the treatment that they need. Prices can be reduced by strategies such as manufacturing the oral morphine in the country, eliminating taxes and tariffs, regulating markup charges, and regularly monitoring the distribution chain. However, these measures are related to wider aspects in the respective country such as the Human Development Index.[35]

Limitations

Although the OPW follows a methodology similar to the one used by HAI/WHO, the latter does not include controlled medications. Opioids are internationally controlled; thus, the availability and pricing are impacted by additional factors, such as markups resulting from safety and security measures required by the national laws on the manufacturing, importation, distribution, storage, and dispensation. This survey is unable to determine the extent of the impact of these measures on the dispensed price of the medication.

This study is based on the data collected from external collaborators, and it is not possible to determine how rigidly they followed the instructions.

This study is a one day cross-sectional survey. Out-of-stock situations occur frequently, especially in LIC and MLIC, so the results on availability might differ in a longitudinal survey. However, the results reflect the situation that patients in need of opioids may face in any given day.

The study is based on a sample of data of a local pharmacy in the selected countries, which is not representative of the whole country. However, the fact that pharmacies were located to major treating centers may indicate that other pharmacies distant from hospitals may have fewer medications in stock.

The OPW indicates differences in opioid prices among different locations. With the exception of morphine oral solid IR, it does not take into account the differences in purchasing power among countries. Future studies using purchasing power parity should be carried out to measure how prices may affect access to other opioids.

Conclusion

The study indicates that patients in LIC and MIC have less access to opioid medications

and highlights the need to continue efforts at improving their availability and affordability. Efforts should be made by governments, health care administrators, and pharmacists to ensure that opioids are available in local pharmacies near to the health care facilities that provide care for life-threatening conditions. Results also show an unexpected favorable price difference for fentanyl TPs over IR morphine, indicating heavy subsidies for fentanyl. Additional studies are needed to identify the reasons why morphine, which is cheaper than other medications, is not included in subsidy programs, even in countries with limited resources. Although availability of several opioids and formulations is desirable, it is also critical to ensure access to morphine, which has been proven to be efficacious and safe for severe pain treatment and has been classified as an essential medicine for the treatment of pain by the WHO. Additional studies are also needed to identify the extent that factors such as restrictive laws and regulations have on the dispensed price of opioid medications.

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Contributors: The following individuals made comments to the project proposal and contributed to Opioid Price Watch:

International Association for Hospice and Palliative Care (IAHPC) Board members: Eduardo Bruera (U.S.), James Cleary (U.S.), Arthur Lipman (U.S.), and M.R. Rajagopal (India)

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WHO Department of Essential Medicines and Health Products (Geneva): Willem Scholten, Dele Abegunde, Barbara Milani, and Anne Nguyen.

External contributors: Rosa Buitrago (Panama) and David Joranson (U.S.)

Participants: Sofia Bunge (Argentina), Mariam Lubna (Bangladesh), Lilian Hennemann (Brazil), Natalie Rodriguez (Chile), Laura Tupper (Chile), Jinxiang Li (China), Di Xiao (China), Aweke Yilma Dubi (Ethiopia), Heike Reineke-Bracke (Germany), Eva Duarte (Guatemala), Ann Thyle (India), Mamak Tahmasebi (Iran), Mildred Agnes Waka (Kenya), Natalia Carafizi (Moldova), Mina Kumari Ranabhat (Nepal), Brian Ensor (New Zealand), Olaitan Soyannwo (Nigeria), Dagny Faksvåg Haugen (Norway), Jesus Eugenio de Jesus (Philippines), Aleksandra Kotlinska-Lemieszek (Poland), Iwona Zaporowska-Stachowiak (Poland), Daniela Mosoiu (Romania), Olga Usenko (Russia), Nahla Gafer (Sudan), Miriam Giraldez (Spain), Mark Jacobson (Tanzania), Alick Kayange (Tanzania), Michael King'ori (Tanzania), Zirimenya Ludoviko (Uganda), Scott Murray (U.K.), Moira Cookson (U.K.), and Maria Mercedes Bernada (Uruguay).

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Appendix

Sample Data Collection Form

___If NONE of the opioids listed in this study are available at ANY TIME in your country, check this box
___If opioids are available in your country ONLY in hospital pharmacies (and NOT in street pharmacies) check this box

If your country has a tiered system in which medicines (including opioids) are priced according to the person's income level, report the price that a patient earning the lowest minimum wage would have to pay.

The form will require providing information on the prices for the formulations below. To see samples on how to complete this table, click on http://hospicecare.com/opioids/uploads/examples.pdf

Opioid	Check this box if the medication is NOT available in the pharmacy on the day of the survey	Check this box if the medications is dispensed Free (at no cost for the patient)	If patient has to pay, write in numbers the amount required to pay (in your local currency)	Smallest selling dose (total units for dry formulations or total volume for liquid formulations)
Fentanyl (transdermal patches)				
Hydromorphone ampoule, injectable				
Hydromorphone oral solid (tablet or capsule), immediate release				
Hydromorphone oral solid (tablet o capsule), prolonged release				
Hydromorphone oral liquid (oral solution)				
Methadone oral solid (tablet or capsule)				
Methadone oral liquid (oral solution)				
Morphine ampoule, injectable				
Morphine oral solid (tablet or capsule), immediate release				
Morphine oral solid (tablet or capsule), sustained release				
Morphine oral liquid (oral solution)				
Oxycodone oral solid (tablet or capsule), immediate release				
Oxycodone oral solid (tablet or capsule), sustained release				

Number of pharmacies you visited before finding one which has AT LEAST ONE opioid in stock (if available in your country)____
Pharmacy address:

_____

Select the appropriate category (select one): Licensed retail pharmacy ____ Licensed hospital pharmacy:___