

Medication wastage: the current situation

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Educational aims

- To provide an insight into the current situation regarding medication wastage both at a national level and internationally
- To have increased awareness on the extent of medication wastage and its financial implication
- To understand the need for policy and guidelines in relation to medication wastage

Key words

Delphi, medication, medication wastage, systematic review, unused medication.

Abstract

Reducing any wastage, including that of medication, is an important priority objective at both a national and European level due to the direct and indirect consequences of wastage. Following an in-depth study, medication wastage has been defined in the Maltese context. This provides a common ground on which to base local policy to address the issue. The extent of medication wastage has been studied and documented in various countries. Yet to date there is still a lack of policy guidance in relation to medication wastage. This paper highlights the available literature in relation to medication wastage and urges the need to further explore and implement wastage reduction strategies.

Introduction

Reducing any wastage has become an important priority objective at both a national and European level.¹ There are several direct and indirect consequences of medication wastage, mainly the economic implications for both the individual and society arising from costs of unused medications, expenses required to dispose of unused medication, costs related to wasted time spent on the supply based activities of prescribing and dispensing as well as environmental implications associated with wastage disposal.²⁻⁴

Definition of medication wastage

A systematic review of the published literature carried out in 2010,⁵ identifying forty-three papers found that only one study defined medication wastage⁶ or related terms. This was defined as “any drug product, either dispensed by a prescription or purchased over the counter (OTC) that is never fully consumed. Medication wastage may be due to poor compliance of patients, excessive and irrational prescribing, or the lack of control of the sales of prescription medications in the community pharmacy.” A standard definition was later formulated mainly in the Maltese context by applying the Delphi technique amongst a wide range of panel of experts.⁷ Medication wastage was defined as:

“Medication wastage refers to any medication which expires or remains unused throughout the whole medicines supply chain. Medication wastage also refers to the unnecessary or inappropriate consumption of medications by patients, or the unjustified non-adherence to treatment guidelines by healthcare professionals. Medication wastage poses a financial burden on patients themselves and the state’s economy and requires adequate education of all people concerned.”

Medication wastage: The international scenario

The extent of medication wastage has been studied and documented amongst various countries with quantities ranging from 65 unused medication items gathered from 73 households that had at least one oral medication stored⁸ to 20,304 medication packages collected from 100 community pharmacies.⁹ Tablets and capsules topped the list in terms of wasted formulation, probably since this is the most commonly used.¹⁰⁻¹⁶ Cardiovascular^{2,14,17-23} and central nervous

system^{4,9,13,24-26} medication were the most commonly wasted followed by medication acting on the gastro-intestinal^{27,28} and respiratory system.^{29,30} The most commonly wasted medication were from the 'analgesics' category.^{4,8,9,11,14,15,18,22,23,24,25,26,29,31,32,33,34}

Amongst studies, cost of medication wastage was estimated as ranging from approximately 66 euro⁸ to over 770,000 euro.^{35,36} A study assigned and supported by the Department of Health in England in 2009 explored the scale and cost of medication wastage. The study concluded that direct costs of unused prescription medication to the National Health Service (NHS) amounted to £300 million annually.³⁷ A very recent report from NHS England, 'Polypharmacy and Medicines Optimisation' also noted that much dispensed medication remains unused or wasted, and these issues are likely to become more prominent as medication regimens become more complex.³⁸

Medication wastage: The Maltese scenario **The information available about the extent of medication wastage in Malta can be gleaned through press reports and statements from politicians.**

In April 2012, the Times of Malta reported that the Health Minister of the time voiced his concerns about medication wastage, particularly unused medication and "urged people to act responsibly and to keep in mind that although medicines were given to them free of charge, they were an investment by the government".³⁹ The newspaper added that "80 different types of medicine worth around €10,000" had been returned to government pharmacies by members of the public during a three month period with the Health Minister stating that "this was likely to be only the tip of the iceberg, since many people kept unused medicine at home". These medications were not purchased through community pharmacies but dispensed to the public for free through the National Health System (NHS). The Health Minister stated that many people are afraid that if they do not collect the free medication that they are entitled to, they will lose their entitlement. At the time, the shadow Health Minister had commented about the shortage of medication on the NHS formulary leading to wastage: "On the other hand, about 632 different medicines were out of stock in 2011. In simple words: shortages lead to hoarding, and hoarding leads to unused medicine".⁴⁰

Later on that year, in July 2012, the Times of Malta reported that "just over

€29,500 worth of medicines was retrieved from pharmacies in Gozo last month after serious doubts arose as to the ambience in the contractor's carriage of the medicines".⁴¹ The newspaper also reported that "in June there had been €893.32 worth of expired or damaged medicines retrieved, as well as 439.72 worth of medicines for redistribution to other pharmacies". In June 2013 The Times of Malta issued another report revealing a total of 455,000 euro worth of expired medication found at the Oncology and Dermatology Hospital in Malta.⁴²

The Malta Pharmacy Owners Business section, in January 2014, proposed a reimbursement system for free medications whereby patients pay for the free medications they are entitled to and are then reimbursed, with a pre-credited card for patients who are unable to pay.⁴³ The Chamber also contemplated a medication charge which should stipulate the maximum refundable amount on each medication. The Health Minister of the time was not in agreement with a reimbursement system.

In April 2014 The Times of Malta issued findings of a survey study carried out by WasteServ, which is the company responsible for waste management on the Maltese islands, which concluded that only a tenth of the Maltese population dispose of expired medication and syringes correctly, by bringing these to the civic amenity sites which cater for the disposal of expired medication amongst other things. WasteServ also added that EU will be sought to launch a nationwide awareness campaign regarding the civic amenity sites and about hazardous waste.⁴⁴ Later on in September 2014, The Times of Malta reported three tonnes of medications being disposed in civic amenity sites.⁴⁵

Laws, directives and policies relating to medication wastage

The EU directive '2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste states that 'waste' refers to "any substance or object which the holder discards or intends or is required to discard".⁴⁶ The focus of this directive is on management strategies related to issues such as disposal and recycling, with lack of guidance focusing specifically on medication. The Medicines Act of Malta enacted by the Parliament of Malta prohibits the sale of expired or damaged medication, but provides little guidance on the handling of medication

wastage and no guidance at all on minimising wastage.⁴⁷

The Environment and Development Planning Act, under the force of the Malta Environment and Planning Authority, issued waste regulations in 2011.⁴⁸ Whilst 'healthcare waste' includes medication, this Act provides detail only on the maximum amount and duration of storage of wastage.

Following the accession of Malta into the EU a National Waste Management Plan strategy was prepared stipulating a number of implementation aspects to be addressed but with no consideration to medication.⁴⁹

Factors associated with or contributing to wastage

A number of factors have been attributed to medication wastage, mainly 'medication changed',^{2,4,23,24,25,26,32,50,51,52} 'patient death',^{2,4,23,26,27,52,53} 'resolution of patient's condition',^{24,25,27,32,51,53} and 'expired medication'.^{23,24,25,27,52,53} A panel of experts in Malta, identified 61 potential factors which they attributed to medication wastage. The cause leading to medication wastage which achieved the highest level of consensus (96% consensus) was that "patients are afraid that their medication will be unavailable when they need it" and therefore they overstock.⁷

Interventions to reduce wastage

A systematic review identified only two studies which reported wastage as a research outcome measure following intervention, both describing community pharmacy instalment dispensing as a potential solution to reduce medication wastage. However, there were no direct measures of reduction in wastage; therefore, reduction in costs in these studies cannot be equated to reduction in medication wastage.⁵

In 2011 the UK Department of Health roundtable event hosted by the King's fund recruited patients, healthcare professionals, the NHS and industry to consider the findings of the afore-mentioned research and to identify measures that might be taken to help minimise wastage, optimise medication taking and improve health outcomes. Following this, the Department of Health Medicines Pharmacy and Industry group UK issued the report 'Making best use of medicines' and stated that "wastage of medications involves a wide range of different stakeholders who all have a contribution to make to reducing its occurrence and improving quality of care".⁵⁴ These stakeholders include

manufacturers and suppliers of medications; healthcare professionals, including pharmacists, doctors and nurses, as well as patients and the public. The report also highlighted the fact that costs related to medication wastage are not just financial but should also take into consideration the price a patient has to pay if medications are not used appropriately at the detriment of improved health outcomes. Through the roundtable event a number of initiatives to improve use of medications emerged. The group concluded that not only should the group participants take ownership of the outcomes and benefits of this study, but they should also engage in future discussions. The group also concluded that patients should be encouraged to become more involved with their medication. The group also acknowledged the fact that issues raised during this discussion should become part of the education of healthcare professionals and the implications of these issues need to be considered by the Department of Health in future discussions relating to community pharmacy contractual framework. The group ultimately supported the initiative of a communications campaign to raise awareness of the issues discussed and alter people's behaviour and concluded that any intervention should be carefully planned before being implemented.

Conclusion

This paper clearly highlights that vast resources are consumed by wastage, with a negative consequence on the economy. Moreover, medication wastage continues to compromise public health in terms of safety and the environment. There is therefore an urgent need to further explore and implement wastage reduction strategies.

Key points

- The extent and cost of medication wastage have been documented locally and internationally.
- A standard definition of medication wastage was formulated mainly in the Maltese context by applying the Delphi technique.
- A number of reasons have been attributed as the causative factors giving rise to medication wastage, mainly 'medication changed', 'patient death', 'resolution of patient's condition', 'expired medication' and overstocking due to fear of medication unavailability.
- There is a paucity of studies reporting medication wastage as a research outcome measure following intervention to reduce medication wastage.
- There is a lack of policy guidance in relation to medication wastage.

Disposal of Medicines in Malta

The general public can dispose of their expired medicines at one of the Civic Amenity sites of WasteServ Malta Limited which are located at Maghtab, Mriehel, Hal Far, Luqa, Ta' Qali and Gozo. Further information may be obtained from WasteServ Malta Ltd on the Freephone (8007 2200).

References

- 1 European Commission. Waste. 2015; Available from: <http://ec.europa.eu/environment/waste/>; Accessed 3rd October 2015.
- 2 Langley C, Marriott J, Mackridge A, Daniszewski R. An analysis of returned medicines in primary care. *Pharm World Sci.* 2005;27(4):296-299.
- 3 Castensson S, Ekedahl A. *Pharmaceutical waste: the patient role.* Germany: Springer; 2010. P. 179-200. (Kummerer K, Hempel M, editors. *Green and Sustainable Pharmacy*; 1st ed.)
- 4 James TH, Helms ML, Braund R. Analysis of Medications Returned to Community Pharmacies. *Ann Pharmacother.* 2009;43:1631-1635.
- 5 West LM, Diack L, Cordina M, *et al.* A systematic review of the literature on 'medication wastage': causative factors and effect of interventions. *Int J Clin Pharm* 2014; 36(5): 873-881.
- 6 Abou-Auda HS. An economic assessment of the extent of medication use and wastage among families in Saudi Arabia and Arabian Gulf countries. *Clin Ther.* 2003;25(4):1276-1292.
- 7 West LM, Diack L, Cordina M, *et al.* Applying the Delphi technique to define 'medication wastage'. *Eur J Hosp Pharm* 2015;22(5):274-279.
- 8 Kiyingi KS, Lauwo JAK. Drugs in the home: danger and waste. *World Health Forum.* 1993;14(4):381-384.
- 9 Ekedahl A, Wergeman L, Rydberg T. Unused drugs in Sweden measured by returns to pharmacies. *JSAP.* 2003;20(1):26-31.
- 10 David BM, Carwardine E, Longmore RB, McDonald C, Page MA. Some results of a campaign for the collection of unused medicines in Perth. *AJP.* 1979;60:350-353.
- 11 Garey KW, Johle ML, Behrman K, Neuhauser MM. Economic consequences of unused medications in Houston, Texas. *Ann Pharmacoth.* 2004;38(7-8):1165-1168.
- 12 Harris DW, Karandikar DS, Spencer MG, Leach RH, Bower AC, Mander GA. Returned-medicines campaign in Birmingham, 1977. *Lancet.* 1979;1(8116):599-601.
- 13 Longmore R, McDonald C, Sunderland B, Kailis S, Marshall C. Examination of a sample from a Medidump campaign in Perth, Western Australia. *AJP.* 1990;9(5):145-149.
- 14 Longmore RB, Sunderland VB, Sansom LN. Analysis of a "Medidump" campaign in Australia. *IJPP.* 1995;3(3):186-191.
- 15 Subratty AH, Hased Nathire ME. A survey on home generated medical waste in Mauritius. *Int J Environ Health Res.* 2005;15(1):45-52.
- 16 Wongpoowarak P, Wanakamane U, Panpongtham K, Trisdikoon P, Wongpoowarak W, Ngorsuraches S. Unused medications at home - reasons and costs. *IJPP.* 2004;12:141-148.
- 17 Al Siyabi KH, Al Riyami K. Value and types of medicines returned by patients to Sultan Qaboos University Hospital pharmacy, Oman. *Sultan Qaboos Univ Med J.* 2007;7(2):109-115.
- 18 Boivin M. The cost of medication waste. *Can Pharmaceut J.* 1997;130(4):33-39.
- 19 Grant P. Return of waste medicines to a community pharmacy. *Prescriber.* 2001;12(4):29-38.
- 20 Halloran TN, Frewen DB, Frost, BR. An evaluation of the cost of drug wastage in a South Australian community - a pilot study. *Aust J Hosp Pharm.* 1978;8(3):84-86.
- 21 Guirguis K. Medications collected for disposal by outreach pharmacists in Australia. *Pharm World Sci.* 2010;32(1):52-58.
- 22 Henderson S. Hospital pharmacy: survey of unwanted medicines. *PJ.* 1984;232:603-5.
- 23 Mackridge AJ, Marriott JF. Returned medicines: waste or a wasted opportunity? *J Pub Health.* 2007;29(3):258-262.
- 24 Braund R, Chuah F, Gilbert R, Gn G, Soh A, Yin Tan L, *et al.* Identification of the reasons for medication returns. *NZFP.* 2008;35:248-252.
- 25 Braund R, Gn G, Matthews R. Investigating unused medications in New Zealand. *Pharm World Sci.* 2009;3(6):664-669.
- 26 Hawke GM, Wright DJ, Chrystyn H. A detailed analysis of the day to day unwanted medicinal

- products returned to community pharmacies for disposal. *JSAP*. 1996;13(4):215-222.
- 27 Coma A, Modamio P, Lastra CF, Bouvy ML, Marino EL. Returned Medicines in community pharmacies of Barcelona, Spain. *Pharm World Sci*. 2008;30(3):272-277.
 - 28 Sweileh WM, Ansam F, Sawalha AF, Zyoud SH, Al-Jabi SW, Bani Shamseh FF et al. Storage, utilization and cost of drug products in Palestinian households. *Int J Clin Pharmacol Ther*. 2010;48(1):59-67.
 - 29 Abahussain EA, Ball DE. Disposal of unwanted medicines from households in Kuwait. *Pharm World Sci*. 2007;29(4):368-373.
 - 30 Isacson D, Olofsson C. Drugs up in smoke: a study of caseated drugs in Sweden. *Pharm World Sci*. 1999;21(2):96-9.
 - 31 Braund R, Yuen Y, Jung J. Identification and quantification of medication returned to Otago pharmacies. *NZFP*. 2007;34(4):258-262.
 - 32 Morgan TM. The economic impact of wasted prescription medication in an outpatient population of older adults. *J Fam Pract*. 2001;50:779-781.
 - 33 Pervanas HC, Cooper MR, Robert L. Description of a medication disposal event in a managed care setting. *J Pharm Technol*. 2010;26:264-270.
 - 34 Wasserfallen JB, Bourgeois R, Bula C, Yersin B, Buclin T. Composition and cost of drugs stored at home by elderly patients. *Ann Pharmacother*. 2003;37(5):731-737.
 - 35 Zargarzadeh AH, Tavakoli N, Hassanzadeh A. A survey on the extent of medication storage and wastage in urban Iranian households. *Clin Ther*. 2005;27(6):970-8.
 - 36 European Central Bank. Euro foreign exchange reference rates. 2012; Available from: <http://www.ecb.int/stats/exchange/eurofxref/html/index.en.html>; Accessed 15 January 2012.
 - 37 York Health Economics Consortium, School of Pharmacy University of London. Evaluation of the scale, causes and costs of waste medicines, 2010; http://eprints.pharmacy.ac.uk/2605/1/Evaluation_of_NHS_Medicines_Waste_web_publication_version.pdf; Accessed 8 February 2011.
 - 38 Duerden M, Avery T, Payne R. Polypharmacy and medicines optimisation. Making it safe and sound. The King's Fund, 2013; http://www.kingsfund.org.uk/sites/files/kf/field/field_publication_file/polypharmacy-and-medicines-optimisation-kingsfund-nov13.pdf; Accessed 16 March 2014.
 - 39 Times of Malta. Returned unused medicines are 'tip of the iceberg'. 2012; Available from: <http://www.timesofmalta.com/articles/view/20120404/local/returned-unused-medicines-are-tip-of-the-iceberg.414136>; Accessed 19 April 2013.
 - 40 Maltatoday. Destruction of 'wrongly stored' unused medicines at taxpayers expense. 2012; Available from: <http://www.maltatoday.com.mt/news/national/17453/destruction-of-wrongly-stored-unused-medicines-at-taxpayers-expense-20120414#.VFZjTdoZlIU>; Accessed 2 November 2014.
 - 41 Times of Malta. *Gozo medicine is retrieved*. 2012; Available from: <http://www.timesofmalta.com/articles/view/20120706/local/Gozo-medicine-is-retrieved.427366>; Accessed 2 November 2014.
 - 42 Calleja, C. 'Shame' of health waste. Times of Malta. 2013; Available from: <http://www.timesofmalta.com/articles/view/20130612/local/-Shame-of-health-waste.473472>; Accessed 25 October 2013.
 - 43 Dalli, M. Malta Chamber proposes 'reimbursement system' for free medicines. 2014; Available from: <http://www.maltatoday.com.mt/news/national/33211/malta-chamber-proposes-reimbursement-system-for-free-medicines-20140117#.VEv85TccTIU>; Accessed 25 October 2014.
 - 44 Times of Malta. 42% of people never use a civic amenity site - WasteServ. 2014; Available from: <http://www.timesofmalta.com/articles/view/20140425/local/42-of-people-never-use-a-civic-amenity-site-wasteserv.516377>; Accessed 25 October 2014.
 - 45 Micallef, K. Use of civic amenity sites is now at an all-time high. The Times of Malta. 2014; Available from: <http://www.timesofmalta.com/articles/view/20140908/local/Use-of-civic-amenity-sites-is-now-at-an-all-time-high.534800>; Accessed 25 October 2014.
 - 46 Directive 2008/98/EC. Directive 2008/98/EC of the European parliament and of the Council of 19 November 2008, *Official Journal of the European Union*. 2008; Available from: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:312:0003:0030:en:PDF>; Accessed 23 November 2014.
 - 47 Malta Government Gazette. *Medicines Act*. 2003; Available from: <http://justiceservices.gov.mt/DownloadDocument.aspx?app=lp&itemid=16547&l=1>; Accessed 19 November 2014.
 - 48 Environment and Development Planning Act Cap. 504. *The waste regulations*. 2011; Available from: <http://www.mepa.org.mt/LpDocumentDetails?syskey=1358>; Accessed 26 October 2014.
 - 49 Ministry for Resources and Rural Affairs. *A solid waste management strategy for the Maltese islands*. 2009; Available from: https://www.google.com.mt/?gws_rd=ssl#q=A+solid+waste+management+strategy+for+the+Maltese+islands; Accessed 26 October 2014.
 - 50 Abahussain EA, Ball DE, Matowe WC. Practice and opinion towards disposal of unused medication in Kuwait. *Med Princ Pract*. 2006;15(5):352-357.
 - 51 Braund R, Peake BM, Shieffelbien L. Disposal practices for unused medications in New Zealand. *Environ Int*. 2009;35(6):952-955.
 - 52 Cook H. Why so many drugs go to waste. *PiP*. 1996;6(8):268-70.
 - 53 Ekedahl ABE. Reasons why medicines are returned to Swedish pharmacies unused. *Pharm World Sci*. 2006;28(6):352-358.
 - 54 Department of Health Medicines Pharmacy and Industry Group. Making best use of medicines. 2011; Available from: <https://www.gov.uk/government/publications/making-best-use-of-medicines-report-of-a-department-of-health-roundtable-event-hosted-by-the-king-s-fund>; Accessed 2 November 2014.