

Comparison of Abbreviation Usage Practices in Two Philippine Tertiary Hospitals and Perceived Effects on Medical Training

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ABSTRACT

Objectives. To (1) compare abbreviation usage practices in the Doctors' Orders and History Sheet in two tertiary hospitals in Cebu City, namely, Cebu Velez General Hospital (CVGH) and Vicente Sotto Memorial Medical Center (VSMMC); (2) determine why medical students and physicians use abbreviations and (3) determine the perceived effects on medical student training.

Methods. This is a descriptive cross-sectional study utilizing medical chart reviews as well as group and key informant interviews. Stratified Random Sampling with Proportionate Allocation was used to select 100 charts each from CVGH and VSMMC. Purposive sampling was done for key informants.

Results. All patients' clinical history, physical examination and doctors' orders in all departments of both hospitals contained abbreviations. First initialization was the most common form, e.g. BP (blood pressure). Non-universally-accepted abbreviations were common, e.g. HFD (heredofamilial disease). Potentially dangerous abbreviations were noted, e.g. d/c, D/C. Abbreviations were used to maintain patient-doctor confidentiality, save space and time, and for convenience. Perceived effects on medical training included speeding up of task performance.

Conclusions. Use of abbreviations in medical charts among medical students and physicians in both private and public tertiary hospitals in the Philippines is a prevalent practice. While such has its perceived benefits, it also poses potential danger to patients because not all abbreviations are understood and used the same way. Medical schools and their training hospitals must initiate moves to standardize the use of abbreviations in medical education and promote awareness of their potential dangers.

The authors suggest that potential dangers/benefits of abbreviations be formally introduced in medical school as a separate topic.

Key Words: abbreviation usage among medical students, perceived effects, medical training

Introduction

An abbreviation is a shortened form of word or phrase. It is basically a shortcut and its prevalence in medical training is made more probable especially in today's generation of students and physicians known as the Net Generation or Millennials who typically do not want to read large amounts of text. Millennials are described as having grown up with technology with the ability to multitask and communicate through texting and instant messaging.¹ For them perhaps, abbreviation offers convenience.

Abbreviations along with symbols are "...frequently used to save time and effort when writing prescriptions and documenting in patient charts."²

Liu & Lussier pointed out that, "Writing favors brevity because time pressures often prevent medical specialists from describing clinical findings fully. Many medical words and phrases are long and abbreviations are a convenient way to shorten them."³

Cognitive psychologist George Miller's theory seems to support this. He explained that an individual tends to handle information better when it is converted into manageable chunks.⁴

Information, in the form of medical terms, appears to be more easily processed and retained if converted to a convenient "chunk" -- its abbreviated form. Thus, it appears that abbreviations may have some positive outcomes.

However, there is also a negative side to abbreviations.

Many abbreviations used in medicine are ambiguous. An example is the abbreviation "PT" which was used five different times with four different meanings in a set of orders.²

Supporting the existence of this ambiguity, Liu, Lussier and Friedman reported that Unified Medical Language System abbreviations were "...highly ambiguous: 33.1% of abbreviations with six characters or less had multiple meanings (e.g. the abbreviation Ca which has 2 different full

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forms, calcium and cancer); the average number of different full forms for all abbreviations with six characters or less was 2.28."³

Combined with poor handwriting and tendency for self-made variations, some abbreviations have now been considered as dangerous, a term frequently mentioned by Institute of Safe Medications Practice (ISMP) literature. As a result of these dangerous abbreviations, delays in patient care and possible patient harm or even death are preventable consequences waiting to happen.^{2,5}

It has been recognized that a major cause of medication errors is the ongoing use of potentially dangerous abbreviations and dose expressions. Indeed, there were warnings and reports by watchdog agencies such as the Institute of Safe Medical Practices and the Joint Commission regarding frequently-misinterpreted abbreviations some of which have been involved in actual harmful medication errors such as the misinterpretation of U as zero related to insulin dosage prompting different health agencies to take action in reducing unclear medication abbreviations and also the ISMP to release a list of potentially dangerous abbreviations – the List of Error-prone abbreviations, Symbols and Dose Designations.^{2,6,7,8}

The effect of use of abbreviations however, is not limited to actual patient care. According to Davis, "[the use of dangerous abbreviations] lengthens the time needed to train individuals in the health fields and wastes the time of health care workers in tracking down their meaning."⁹ This implies an effect in the training of medical students specifically, the senior clerks, the future practicing clinicians who often refer to the chart record for either writing progress notes or discharge summaries and for learning about the diagnosis and management of different cases during the major part of their medical school training done in hospitals.

Little is known about the abbreviations that are being used in our local hospitals. Much of what is known about abbreviation usage in the field of medical training does not come from local literature.

In addition, a review of existing course offerings by various medical schools in Cebu, including Cebu Institute of Medicine (CIM), revealed no formal subject or module devoted to studying abbreviations used in clinical practice. It is unclear how the teaching of the said abbreviations is approached in local medical schools.

This study could aid policy makers in medical education in deciding the best approach to teaching medical students regarding abbreviation usage. Also, the results of this study could assist stakeholders in proposing guidelines as regards standardization of abbreviation usage by health care workers in various hospitals across the country starting with Cebu City. This could likewise lead to the formulation of a local "Do Not Use" List like that of ISMP.

Objectives

The aims of this study are to:

1. describe the abbreviation usage practices in the Doctors' Orders as well as in the History Sheet of Patient Charts of the different clinical departments in Cebu Velez General Hospital and Vicente Sotto Memorial Medical Center.
2. compare and contrast the abbreviation usage in the two hospitals and in the different departments in the same hospitals.
3. determine the reasons why medical students and physicians use the abbreviations that they use
4. determine the perceived effects of abbreviation usage on training of medical students or residents.

Methods

This research paper employed a descriptive cross-sectional study design that utilized secondary data through chart reviews and primary data through face-to-face group interviews and key informant interviews.

Cebu Velez General Hospital (CVGH) and Vicente Sotto Memorial Medical Center (VSMMC) were chosen as study sites.

Vicente Sotto Memorial Medical Center (VSMMC) is a government-owned teaching hospital offering affordable medical care to a huge volume of patients coming from all over the Cebu Province. Many medical senior clerks, from CIM and outside CIM, rotate in this institution for training purposes. Likewise, physicians who train and practice their profession in this hospital come from various medical schools.

In contrast, the privately-owned Cebu Velez General Hospital (CVGH) caters to a smaller number of patients where only CIM senior clerks rotate. It is the main training hospital for Cebu Institute of Medicine (CIM) students. Majority of residents and clinicians who admit patients in CVGH are CIM graduates.

A sample size of 100 chart records from each hospital were chosen taking into consideration the recommendations by Fraenkel & Wallen on the minimum number required for descriptive studies.¹⁰

Stratified Random Sampling with Proportionate Allocation was done by taking the actual number of samples from each department based on the corresponding proportion of patients that each department admitted for the Year 2006.

After pretesting, selected charts were checked one by one for abbreviations in the Doctors' Order sheet and the History sheet. Using a tally form sheet each for the history and the orders, the abbreviations were listed together with their intended meanings. A certain abbreviation was recorded only once in the whole order sheet even if it was

observed more than once in several orders. Likewise, a certain abbreviation was recorded only once in the whole History sheet. The number of different order entries was counted as well as the number of orders with abbreviations.

The respondents for the interview were selected through purposive sampling. Sixteen Year 2006 Senior Clerks were interviewed as a group. Key informants, such as a Medical school dean, a Hospital Medical Director, a former Chief of Hospitals, a former and a current Clinical Coordinator, a Junior Clerkship Overall Coordinator, and a Community Medicine Coordinator were selected based on their current or past experience in various important administrative positions and as practicing clinicians. The remaining key informants were residents who were selected for their experience as first-line personnel who write orders in the charts.

The interviews involved the use of an interview schedule consisting of different sets of open-ended questions for the Year 2006 senior clerks, clinics coordinators, consultants or private practitioners, residents and junior consultants, the dean and hospital medical directors which were also pretested prior to the actual interview. The conversations during the interview were recorded, with nonverbal communications noted.

Data were encoded and analyzed using Microsoft Excel 2007 equipped with Analysis Tool Pack, with level of significance set at 0.05.

The percentage of orders with abbreviations was determined for the different departments and for each hospital. The abbreviations were also categorized into various forms and the number of abbreviations that belonged to each form was then determined. The corresponding proportions for each form per hospital were computed and the most common abbreviations for each form tabulated. Dubious abbreviations were identified along with other notable abbreviations. Abbreviations that can be categorized into "In the Do Not Use (DNU) List" were counted and the proportion of abbreviations in the DNU List was expressed in percentages. To determine difference in proportions, Chi-square test for Homogeneity was done.

Results

Prevalence of abbreviations

Abbreviations were noted in all (100%) of the reviewed History sheets. Practically all of the orders contained abbreviations whether in CVGH or VSMC as shown in Table 1.

Form of abbreviations

For both the History sheet and Doctors' Orders in the 2 hospitals, the *first letter initialization* (e.g. BP for blood pressure, PTA for prior to admission) was the most popular form of writing abbreviations (Table 2).

Table 1. Frequency of Abbreviations in Doctors' Orders in CVGH and VSMC by Department, 2006

Departments	Total Orders ^a	With Abbreviation ^b	Percent ^c
CVGH			
Med	407	393	96.56
OB	135	134	99.26
Pedia	464	438	94.40
Surgery	124	112	90.32
VSMC			
Med	277	269	97.11
OB	216	208	96.30
Pedia	217	212	97.70
Surgery	290	274	94.48

^aTotal number of orders observed in the charts

^bTotal number of orders with abbreviations

^cPercent of orders in the charts with abbreviations

Table 2. Distribution of Abbreviations by Form in CVGH and VSMC Doctors' Orders, 2006

Form of abbreviation	CVGH		VSMC	
	No.	%	No.	%
First letter initialization or acronym	311	30.55	263	26.25
Compound abbreviation	152	14.93	141	14.07
Truncating the end or clipping	111	10.90	131	13.07
Latin-derived abbreviations	89	8.74	63	6.29
Syllabic abbreviation	63	6.19	77	7.68
Dose expression & measurement unit	59	5.80	84	8.38
Symbols	58	5.70	77	7.68
Substitution initialization	46	4.52	48	4.79
Shorthand	35	3.44	35	3.49
Abbreviation separated by symbols	32	3.14	29	2.89
Doubling of initial letter	17	1.67	13	1.30
First and last letter combination	15	1.47	14	1.39
Text speak or chat language	12	1.18	12	1.20
Opening letter followed by last letter	8	0.79	10	1.00
Combination initialization	6	0.59	5	0.50
First letter for the first component only	2	0.20	0	0.00
First letter followed by last syllable	2	0.20	0	0.00

In the Doctors' Orders, there is a notably significant difference in the proportion between the 2 hospitals in the following forms: *dose expression and measurement unit* ($p=0.023$), *Latin-derived abbreviations* ($p=0.036$) and *first letter initialization* ($p=0.032$). In addition, only about 1 in 100 abbreviations recorded from the orders in both hospitals belonged to the *text language form* (abbreviations that are known to be used in texting or short message service as well as internet messaging; e.g. txt for text, u for you). Nevertheless, the most common examples for each form were almost the same for both hospitals. To illustrate, under the first letter initialization form, both hospitals share the same most common examples – CBC and TPR. Under truncating the end form, they both commonly use the abbreviation "meds" and "tab".

Dubious abbreviations in the Doctors' Orders in CVGH and VSMC

The presence of dubious abbreviations were observed in the charts that were reviewed in CVGH and VSMC (e.g. AP for abdominoperineal, attending physician and appendicitis). Some of them are tabulated as a combined list for all departments in both hospitals in Table 3.

Table 3. Abbreviations with Multiple Meanings Observed in Doctors' Orders in CVGH and VSMC Chart Records Combined, 2006

Abbreviation	Intended Meaning
+	Positive, and
°	Hours, degrees
AP	Abdominoperineal, attending physician, appendicitis
BT	Blood typing, blood transfusion
cap, CAP	Capsule, Community-acquired Pneumonia
cont.	Continue, contraction
ct, CT	Clotting time, count
d/c, D/C	Discontinue, discharge, dilatation and curettage
HR	Heart rate, Humulin R, Hour
IM	Intramuscular, Internal Medicine
L	Levels, liters
mkD, MKD, m/k/D, mkd	Milligram per kilogram per day, milligram per kilogram per dose
ML, ml	Main Line, milliliters

Other notable abbreviations include: "OOT" for out of town, "2D-ED" for 2-dimensional echocardiogram, "ROC" for room of choice, "Pr." for prongs and "TYVM", for thank you very much.

In all the departments whether in CVGH or VSMC, abbreviations in the Do Not Use List of the ISMP were observed. Majority of them were those that contain "/" which indicates "per", separates doses or simply separates 2 words.

In CVGH, OB-Gyne had the most number of abbreviations found in the DNU List. Among all abbreviation types in that department, 16.42% were found in the DNU List. Aside from the frequent use of "/", the following abbreviations in the DNU List were found in OB-Gyne: hs, IU, MgSO₄ and OD. The results for the other departments that also used abbreviations in the DNU list were as follows: Medicine 16.12%, Pediatrics 14.60% and Surgery 11.01%.

In VSMC, percentage of abbreviations found in DNU List from Medicine, OB-Gyne, Pediatrics and Surgery was 14.23, 10.94, 15.61 and 12.69, respectively which was relatively fewer compared to those of CVGH.

Both hospitals almost share the same abbreviations found in the DNU List.

Reasons why medical students used abbreviations

Clerks and 4th year medical proper students utilized abbreviations when they wrote orders under a licensed physician's supervision, medical abstracts and patient histories. Abbreviations were also written to keep up with consultants who were dictating orders, in entering data in the census or logbook of cases and in writing the diagnosis in the department office's white board during endorsement.

During the earlier year levels in medical proper, abbreviations were used by students as mnemonic devices or memory aids and for faster note-taking.

Reasons why physicians used abbreviations

Abbreviations were used by physicians in various records including the Doctors' Orders and at times, in writing the diagnosis. However, it is interesting to note that abbreviations were also made even verbally like when relaying instructions to a nurse. All interview participants agreed that abbreviations were used to save on time and to speed up tasks especially when attending to a large number of patients simultaneously.

Interviewed physicians also chose to abbreviate when there was little space to write on clinic records. Also, writing abbreviations for hard-to-spell medical conditions or terms facilitated the task at hand.

Abbreviations were very useful not only in hospital chart records but also in private clinic patient records where self-made and non-universal abbreviations were used deliberately as a confidentiality measure.

Perceived effects of abbreviation usage on training of medical students or residents

According to a long-time medical teacher, abbreviation usage does not deter and may even facilitate learning. It makes tasks easier. The general perception is that abbreviations are beneficial.

On the other hand, all the respondents also recognized the potential for abbreviations to cause confusion and miscommunication especially in the event that nurses and other hospital personnel do not understand the intended meaning of the abbreviations used in the chart or when one is not yet used to the prevailing abbreviations in the department or hospital. The ill effects also were said to be felt in processing claims for Philippine Health Insurance Corporation (PhilHealth) benefits and in medico-legal cases where some abbreviations resulted in misinterpretation to the detriment of the patient client. However, two respondents said that the real problem in misunderstanding of abbreviations was caused by poor handwriting.

Discussion

Despite the differences in the two hospitals in terms of number of patients, the medical school of origin of physicians and the medical students rotating in both

hospitals, practically all orders and patient histories in the two hospitals have abbreviations.

In the Patient History sheet and Doctors' Orders of both hospitals, the *first letter initialization* is the most popular form of abbreviation. The apparent preference for this form may be explained by the convenience it offers over other forms. With *first letter initialization*, an individual can shorten multiple words into a single abbreviated term of fewer letters which might be considered a manageable "chunk" as coined by George Miller. "Prior to admission" for example can be shortened to just PTA.

Another explanation for the popularity of this particular form is its seeming acceptance or prevalence in the medical field. Medical references including that used by medical students in the early year levels write disease entities in *first letter initialization form* like CHF, COPD, DM and many more.

In a few forms, there were significant differences in their relative frequency of use between the 2 hospitals such as in the use of symbols (which are more commonly employed in VSMMC) and Latin-derived abbreviations (which is more common in CVGH). This may be attributed to a difference in medical school background and culture among those who made abbreviations. The overwhelming majority of CVGH residents and consultants are CIM graduates while VSMMC physicians is composed of a mix of graduates from different medical schools.

Despite these few differences, majority of the most common examples of abbreviations for each form were almost the same which may be useful in standardizing common abbreviations that should be used.

Nevertheless, there were several dangerous abbreviations cited particularly by the ISMP which were found in the medical charts. There were also dubious abbreviations as in the Unified Medical Language System and some notable abbreviations (e.g. BT for blood typing and blood transfusion; d/c for discontinue, discharge or dilatation and curettage) detected in the study including few text language forms such as @, pls and txt which is starting to be seen in charts which may potentially cause confusion and misunderstanding among hospital personnel.

Although the interviews revealed that indeed abbreviations were seen to be beneficial in various aspects of medical student life and residency training, it is good that the potential for abbreviations to cause confusion within the hospital is being recognized as echoed by the study participants. One even shared an experience on her confusion over the interpretation of AP – whether it is acute appendicitis or acute pancreatitis. However its importance in Philhealth claims and legal matters may not be as well-recognized.

Conclusion

Among fellow physicians and medical students, writing, reading and understanding the most common abbreviations do not appear to be a major problem.

However, there are sometimes differences in abbreviation preference among departments and hospitals due to the differences in medical school background and different hospital practices. There are also potentially dangerous abbreviations that may affect patient care which were noted in the charts. Text language forms, although very few, are starting to appear in the charts.

There may be a need to standardize how common terms are to be abbreviated. Those in the medical field may not be fully aware of the many implications of abbreviation usage such as in PhilHealth matters and legal cases.

Perceived benefits seem to outweigh potential dangers and thus, the prevalence of abbreviation usage. Perceived benefits include both that directly or indirectly affect learning of medical students and physicians alike.

Recommendations

With the aforementioned results, there is a need to formally teach the medical students the good and bad effects of abbreviating and how to abbreviate responsibly.

Since abbreviation usage starts early in medical school, interventions should be started prior to clerkship in Pharmacology class or as one Problem-based Learning module to be known as "Responsible Abbreviation Usage" and continued in the Physical Diagnosis or Clinics in the 2nd and 3rd year levels.

The proposed content is to be tackled in phases and will cover the following topics: (1) Advantages and potential dangers of abbreviating to include discussion of reports of related medication errors from the ISMP (2) The different Do Not Use Lists and their rationale (3) Results of this study (4) Implications for the patient inside and outside the hospital such as PhilHealth and other legal claims and cases (5) Implications on learning.

It is suggested that during the checking of histories, Physical Diagnosis faculty and later, resident monitors should correct and call the attention of students using "Do Not Use" abbreviations and other dubious abbreviations. Legible handwriting should be emphasized.

It is also recommended that abbreviations for common terms used in the charts be standardized.

References

- Oblinger DG, Oblinger JL. Is it age or IT: First steps toward understanding the Net Generation. In: Oblinger DG, Oblinger JL, eds. Educating the Net Generation. Educause [online]. 2005. pp. 2.1-2.20. [cited 2007 October]. Available from <http://www.educause.edu/educatingthenetgen>.
- Joint Commission on Accreditation of Healthcare Organizations. Medication errors related to potentially dangerous abbreviations. Sentinel Event Alert 23. [online]. September 1, 2001. [cited 2010 June]. Available from http://www.jointcommission.org/SentinelEvents/SentinelEventAlert/sea_23.htm.
- Liu H, Lussier YF, Friedman C. A study of abbreviations in the UMLS. Proc AMIA Symp. [online]. 2001: 393-7. [cited 2010 June]. Available from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2243414/pdf/procamiasymp00002-0432.pdf>.
- Baine D. Mnemonic strategies: One. In: Baine D, ed. Memory and instruction, 1st ed. New Jersey: Educational Technology Publications; 1986. p. 42.
- Institute for Safe Medication Practices. Please don't sleep through this wake up call. ISMP Medication Safety Alert. [online]. May 2, 2001. [cited 2006 September]. Available from <http://www.ismp.org/newsletters/acutecare/articles/20010502.asp>.
- Greater New York Hospital Association Medication Safety Workgroup. Reducing abbreviations in medication orders: An action plan and resource guide. [online]. 2001. [cited 2010 June]. Available from <http://www.mshp.org/document/gnyha-reducing-use-of-abbreviations.pdf>.
- U.S. Food and Drug Administration. FDA and ISMP launch campaign to reduce medication mistakes caused by unclear medical abbreviations. FDA News. [online]. June 14, 2006. [cited 2010 June]. Available from <http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/2006/ucm108671.htm>.
- Institute for Safe Medication Practices. ISMP's list of error-prone abbreviations, symbols and dose designations. [online]. 2010. [cited 2010 June]. Available from <http://www.ismp.org/PDF/ErrorProne.pdf>.
- Davis NM. Medical Abbreviations. Introduction. [online]. 2005. [cited 2006 September]. Available from <http://www.medabbrev.com/>.
- Fraenkel JA, Wallen NE. The basics of educational research. In: Fraenkel JA, Wallen NE, eds. How to design and evaluate research in education, 6th ed. New York: McGraw-Hill; 2006. p. 104.

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