A Nudge to Physicians to Achieve LDL goals

Reagan F Cabahug, MD. MSc [1,2]

1. Davao Medical School Foundation
2. Metro Davao Medical and Research Center, Philippines

Abstract

Reduction in coronary events rates in high-risk patients is feasible by altering cardiovascular risk factors. In the US and most European Countries, the ~~important~~ leading cause of death is coronary heart disease (CHD). Hypercholesterolemia is the principal risk factor for coronary artery disease. High-density lipoprotein (HDL-C) and low-density lipoprotein (LDL-C) are significant risk factors for CHD (Assmann, 2006). Hydroxymethylglutaryl-CoA (HMG-Co-A) inhibitors are the most effective treatment of cutting LDL-C levels with a subsequent reduction in cardiovascular death and morbidity. A nudge happens when a choice architecture is planned to control behaviour predictably without curbing an individual's choice (Patel, 2011). For a nudge to be influential, the direction and force should be in line with professional standards. The ~~essay~~ article detailed how patients' and physicians' actions contributed to the increasing incidence of cardiovascular diseases. Nudges either digital or manual (use of post-it) can be useful in influencing physicians to be proactive and can increase patients' adherence to the therapy. Trust between the patient and the physician is crucial in attaining these goals. Nudges can be a valuable management tool for steering correct behaviours among healthcare providers. The technique is to ensure that physicians see them as something constructive and not irritating or controlling noodges.

Introduction:

Defining a break in continuity:

According to the World Health Organization (WHO), 19.9 million people die of cardiovascular diseases, which is 31% of all death worldwide. Cholesterol-lowering agents such as statins are known to reduce the risk of dying from a heart attack and stroke. About 6% of Heart attacks and strokes are prevented by one mmol reduction in the levels of LDL-C. However, more than 50% of those taking statins in primary care failed to achieve cholesterol goals. Despite guidelines and affordability of statins, people still die of cardiovascular diseases

About 48.6% of American adults over 40 years old are candidates for statin therapy based on the 2013 American Heart Association and the American College of Cardiology guidelines on cholesterol management. The latest directive on cholesterol management recommends statin for these patients. Studies in the US support total cholesterol levels of 150mg/dl-200mg/dl and LDL-C levels of 100mg/l promoting "the lower, the better" principle. Randomized clinical trials of the anti-cholesterol drug in

high-risk patients showed that reducing LDL-C levels by 1% cut Atherosclerotic Cardiovascular Disease (ASCVD) risk by 1% (Finkel, 2015). Randomized Clinical Trials like Cholesterol Treatment Trialists' (CTT) Collaborators and HOPE-3 involving low to intermediate-risk individuals had shown benefit from HMG-CoA inhibitors therapy. However, both the AHA/ACC and ESC guidelines did not include the cholesterol treatment recommendations for primary prevention for low to medium risk individuals. A gap is evident in the cholesterol treatment guidelines for low-risk individuals (Pavlovic, 2017).

A wider gap is evident in the implementation of these guidelines for high-risk individuals. Several studies have shown that instructions on cholesterol treatment are not executed correctly in clinical practice (Kotseva, 2001; Fernengo, 2000). Straka (2001) showed 7.8% in Italy and 23% in the US of high-risk individuals were able to achieve the LDL-C goals. Furthermore, 4E-Registry showed huge discrepancies between guidelines and therapeutic management habits of office-based medical doctors in Germany (Assmann, 2006). From this study, 7.3% to 21.3% of high-risk individuals were under treated while 19.4% to 57.3% of low-risk patients are over treated.

Nudging to improve guideline implementation

A nudge is a method of affecting behaviour without violating a person's choice (Patel, 2018). To be influential, the force and direction of a nudge should be in line with professional standards

A nudge unit was created by British Prime Minister David Cameron in 2010, using behavioural science to improve government proficiency. The group was able to demonstrate the influence of nudging on peoples' behaviour. There was an increase in organ-donor consent rates when messages advocate mutuality and reciprocity. Nudges can be planned to guide, remind, and motivate expected behaviours. Healthcare delivery is improved when focusing on the less-than-optimal performance of the physicians through nudging. (Patel, 2018 and Navathe, 2019).

However, persuading physicians to practice functional medicine is difficult to achieve. Fatalistic and top-down schools of thought might explain the intricacies of nudging physicians. The fatalistic school of thought describes arrogant and stubborn physicians are simply unmanageable. To follow this involves accepting an individual physician's preferences. In order to change physicians' behaviour, the top-down school of thought, stresses to take away the physicians' freedom of action. Impose clinical algorithms with monetary incentives and penalties are followed (Jackson, 2016). The complexity of medical technology and human biology creates problems with both approaches. Individual patients, diseases, and comorbidities make physicians individualize treatment strategies to achieve optimal medical outcomes. Steering physicians in the right direction through nudging while giving them autonomy to deviate where appropriate is a logical scheme. An example of such is shown in a randomized clinical trial to reduce antibiotic prescriptions in primary physicians using three behavioural interventions such as alternatives (as pop-ups in the electronic medical records), peer comparison (compare order rates with top-performing peers) and accountable justification (give reason for the deviation) showed significant decline in inappropriate use of antibiotics

(Meeker, 2016). The interventions recognized clinical judgment and allowed physicians to use appropriate antibiotics based on clinical findings without penalties.
When electronic health records (EHR) were implemented in the Penn Medicine Nudges Unit to improve health care delivery, generic medicine set as default, prescription of generic drugs increased from 75% to 98%. After myocardial infarction, only 15% are referred to cardiac rehabilitation when it was an opt-in option. Referral increased to 80% after redesigning it as an opt-out option (Patel,2018). Nudging techniques work when properly planned and implemented.
Evidence of the use of nudges in chronic diseases, the National Healthcare Quality Report showed inadequate quality care in patients with chronic diseases despite various interventions. Cancer screenings and adult immunizations increased after computer-generated paper reminders, but unfortunately, this was not successful in chronic diseases like diabetes mellitus and coronary artery disease (Shea, 1996). There was no increase in the use of beta-blockers or cholesterol screening test for coronary artery disease using computer reminders in Veterans Health care system (Demakis, 2000). However, the use of Longitudinal Medical records in community hospitals and outpatient clinics had shown improvement of medical care for both coronary artery disease and diabetes mellitus. The key to the success of the system was effective design and physicians' acceptance (Sequist, 2005).

The following strategies are implemented to address physician's resistance to nudges: transparency of purpose, co-creation of content, and constructive framing (Navathe, 2019). Explicitly disclosing the default options did not diminish the impact of nudges because transparency provides an avenue for dialogues about the purpose and goals of nudges. Managers and physicians should co-create nudges so that the interventions match with the culture and insights of the organization. Providing feedback on their performances compared to top-notch peers resulted in better health care delivery and patients' outcomes. Nudges that ask clinicians active choice on drug prescription coupled with delivering feedback on how each physicians' performance compared to their peers, increased default prescriptions.

Whom to Blame:

Non-adherence or poor compliance with medications is a global problem of immense magnitude. Non-compliance is a significant concern to physicians because of dangerous treatment outcomes, grave clinical consequences to patients' health, examples are diseases of lifestyle like ASCVD in adults and accidents in adolescents (Jay,1984) and added economic burden to society by increasing treatment costs. If patients do not obey to the therapeutic strategies, the envisioned favourable effects are not achieved, of even the most sensibly and logically-based treatment plans. Compliance and adherence in healthcare are patient's behaviours in taking medications, following diet instructions, and execution of lifestyle changes coincide with healthcare providers' recommendation for health and medical advice" (Sackett, 1976). Non-compliance of patients take different forms like taking prescriptions but not filling it, taking the medicines at the wrong time and dose, adjusting the frequency of doses, not

following physicians' instructions, white coat compliance (taking prescription at the time of consult) and drug holidays (patient stopping and restarting therapy).

In a recent report, fifty percent of patients given HMG-CoA inhibitors by primary healthcare physicians fail to achieve cholesterol levels as stipulated in the NICE guideline after two years of intake of statins (Akyea, 2019). The latest findings confirmed the results of other similar studies. Therapeutic compliance involves not only patients' adherence to drugs but also lifestyle changes, diet, and regular exercise (Li, 2008). The adherence rate for long term treatment is about 40-50% while short term therapies are 70-80%, and lifestyle changes are 20-30% (Li, 2008). Hypertension therapy adherence is between 50-70%, with only 23% of patients had a compliance rate of about 80%. Li (2008) also identified causes of non-adherence and non-compliance include patient-related issues, therapy-associated factors, social and economic aspects, disease dynamics, and health care system factors.
Females and patients <50 years old tend to be poorly compliant with hyperlipidaemia treatment (Caspard, 2005, Lopes, 2021). Studies involving patients between 40-50 years of age showed higher compliance with increasing age. However, middle age groups (30-59 years) are less compliant, as confirmed by studies in Japan and Singapore. Females follow physicians' advice consistently than ~~their~~ male counterparts. Hispanics, African-Americans, and other minorities had a low compliance rate due to communication problems and low socio-economic status. Patients with low educational status have trust in their physicians' advice thus are more obedient (Senior,2004). Oral drugs, shorter duration of treatment, simple instructions, and fewer drug side effects had been shown to improve treatment adherence. Longer waiting time for clinic visits, problems in filling prescriptions, inaccessible healthcare systems, and discontented patients resulted in defiance to physicians' advice. Patients anticipating worse health status are driven more to conform with therapeutic strategies if they consider the medication to be helpful (Li, 2008).

Healthcare bodies use guidelines and rules to systematize and simplify care to enhance safety, productivity, and efficiency. Healthcare workers, including doctors, have to follow guidelines of hospitals where they are working, government policies, and different health care societies' recommendations. As a result, there are unintended consequences of too many rules. The length, volume, and complexities of guidelines, trivial policy changes, and too many versions of the same rules, create confusion. Fornego (2000) found discrepancies between actual clinical practice and adherence to guidelines and recommendation in the treatment of hyperlipidaemia in UK. The more rules imposed on workers, the less likely they will comply.

Doable solutions

Simplify and standardized guidelines and policies, avoid information overload, and make guidelines accessible would improve adherence by the healthcare workers. It is essential for the Healthcare industry to learn from the methods of other high technology industries. American, British and Europeans have different guidelines for

hyperlipidaemia. The more guidelines the more confusing for clinicians what to follow. So, there is a need to streamline the guidelines and performance is systematized.

Physicians' treatment strategies should be simplified, expected effects and adverse treatment reactions explained well to the patients and significant others. Patients should develop trust and confidence to the treating physicians to enhance their adherence and compliance to the treatment regimen.

A behavioural experiment on physicians using nudging

Nudges can enhance patient outcomes and reduce costs by changing physician behaviours and promoting better care. Nudging is about intervening in a subtle way to improve decision making.

The use of a cluster-randomized trial (CRT) design where individual doctors are randomized as groups in different clinic centres in a locality is a logical plan. CRT focuses on effectiveness by evaluating outcomes under conditions of actual use. The primary outcome is the increased prescriptions and use of statins in patients with ASHD. Interrupted time series (ITS) analysis can estimate efficacy of intervention by continuous sequence of observations interrupted by an intervention. Over time a pattern is observed pre intervention and post intervention. ITS is not affected by confounding variables like social, economic status and population age distribution.

Both experimental designs are useful in estimating the efficacy of population-level health interventions. Reliable results are accomplished by controlling the pros and cons of both designs.

Conclusion:

Nudge strategies can be a valuable management tool targeting healthcare provider behaviours in the implementation of evidence-based guidelines on hyperlipidaemia. Nudges can influence on a positive way the habitual or automatic behaviours by attempting to influence physician's judgement. Thus, it could be an effective tool in improving hyperlipidaemia guideline implementation.

Disclaimer:

There is no conflict of interest with the writing of this article.

Ethical Approval:

As per international standard or university standard ethical approval has been collected and preserved by the authors.

References:

1. Assmann, G., Benecke, H., Neiss, A., Cullen, P., Schulte, H., & Bestehorn, K. The gap between guidelines and practice: Attainment of treatment targets in patients with primary hypercholesterolemia starting statin therapy. Results of the 4E-Registry (Efficacy Calculation and Measurement of Cardiovascular and Cerebrovascular Events, including Physicians Experience and Evaluation). European Journal of Cardiovascular Prevention & Rehabilitation 2006 Oct,13(5), 776-783
2. Bernal, J. L., Cummins, S., Gasparrini, A. Interrupted time series regression for the evaluation of public health interventions: A tutorial. International Journal of Epidemiology.2017 Feb 1; 49(1): 348-355.
3. Akyea, R., Kai, J., Qureshi,N., Iyen, B., Weng, S. Sub-optimal Cholesterol Response to Initiation of Statins and Future Risk of Cardiovascular Disease. Heart 2019; 105:975-981.
4. Buck D, Jacoby A, Baker GA, et al. Factors influencing compliance with antiepileptic drug regimes. Seizure. 1997 Apr; 6(2): 87-93.
5. Demakis, J. G. Improving Residents Compliance with Standards of Ambulatory Care Results from the VA Cooperative Study on Computerized Reminders. JAMA. 2000. 284(11)1411.
6. Finkel, J. B., & Duffy, D. 2013 ACC/AHA cholesterol treatment guideline: Paradigm shifts in managing atherosclerotic cardiovascular disease risk. Trends in Cardiovascular Medicine 2015 May;25(4), 340-347.
7. Fornengo, P., Bruno, G., Da Silva, A., Acari, R., Pisu, E., & Pagano, G. Low adherence of General Practitioners to the National Cholesterol Education Program guidelines for the management of hyperlipidemia [Abstract]. Diabetes, Nutrition Metabolism. 2000 Oct; 13(5): 263-8.
8. Jackson, B., MD. Nudging Our Way to More Efficient Care. How to Win Friends Among Doctors While influencing them. Clinical Laboratory News. April 1, 2016.
9. Kotseva, S., Stagmo, M., De Bacquer, D., De backer, D., & Wood, D. Lifestyle and risk factor management and use of drug therapies in coronary patients from 15 countries. Principal results from EUROASPIRE II Euro Heart Survey Programme. European Heart Journal,2001. 2(7), 554.
10. Li, S., & Ji, J. Factors affecting therapeutic compliance: A review from the patients' perspective. Therapeutics and Clinical Risk Management, 2008 Feb; 4(1): 269-286.
11. Meeker, D., Linder, J. A., Fox, C. R., Friedberg, M. W., Persell, S. D., Goldstein, N. J.,Doctor, J. N. Effect of Behavioral Interventions on Inappropriate Antibiotic Prescribing Among Primary Care Practices. JAMA.2016. 315(6), 562.
12. Navathe, A. S., Lee, V. S., & Liao, J. M. How to Overcome Clinicians' Resistance to Nudges. Behavioral Economics. May 03, 2019.
13. Patel, M., & Asch, D. Nudge Units to Improve the Delivery of Health Care | NEJM 201 Feb 19. 8(378): 214-216.

14. Patel Mitesh. Nudge units to Improve the Delivery of Health Care. New England Journal of Medicine 2018: 378 (3): 214-216.
15. Pavlović, J., Greenland, P., Deckers, J. W., Kavousi, M., Hofman, A., Ikram, M. A., Leening, M. J. Assessing gaps in cholesterol treatment guidelines for primary prevention of cardiovascular disease based on available randomized clinical trial evidence: The Rotterdam Study. European Journal of Preventive Cardiology, 2017. 25(4), 420-431.
16. Sackett DL. Haynes RB. Compliance with therapeutic regimens. Baltimore: Johns Hopkins University Press. 1996. 197: 293.
17. Sequist, T. D., Gandhi, T. K., Karson, A. S., Fiskio, J. M., Bugbee, D., Sperling, M., Bates, D. W. (2005). A Randomized Trial of Electronic Clinical Reminders to Improve Quality of Care for Diabetes and Coronary Artery Disease. Journal of the American Medical Informatics Association,12(4), 431-437.
18. Sirey JA, Bruce ML, Alexopoulos GS. Perlick, DA., Friedman, SJ, Meyers, BS Stigma as a barrier to recovery: Perceived stigma and patient-rated severity of illness as predictors of antidepressant drug adherence. Psychiatr Serv. 2001 Dec; 52(12):1615–20.
19. Shea, S., Dumouchel, W., & Bahamonde, L. A Meta-analysis of 16 Randomized Controlled Trials to Evaluate Computer-Based Clinical Reminder Systems for Preventive Care in the Ambulatory Setting. Journal of the American Medical Informatics Association. 1996. 3(6), 399-409.
20. Straka, R. J., Taheri, R., Cooper, S. L., Tan, A. W., & Smith, J. C. Assessment of Hypercholesterolemia Control in a Managed Care Organization. Pharmacotherapy 2001,21(7), 818-827.
21. Turner SL, Karahalios A, Forbes AB, Taljaard,M., Grimshaw, J., Cheng, A.,Bero, L.,McKenzie, J.Design characteristics and statistical methods used in interrupted time series studies evaluating public health interventions: protocol for a review. Journal of Clinical Epidemiology June 2020. 122. 1-11.
22. Jay, S.,Litt, I., Durant, R. Compliance with Therapeutic Regimen. Journal of Adolescent Health Care. 1984 p124-136.
23. Caspard, H., Chan,A., Walker,A., Compliance with statin treatment in a usual-care setting: retrospective database analysis over 3 years after treatment initiation in health maintenance organization enrollees with dyslipidemia. Clinical Therapeutics. 2005 Oct;27(10) 1639-46.
24. Lopes, J., Santos, P., Determinants of Non-Adherence to the Medications for Dyslipidemia: A Systemic Review. Patient Prefer Adherence. 2021 Aug 24;15:1853-1871.
25. Senior, V., Marteau, TM.,Weinman, J. Self Reported Adherence to cholesterol-lowering medication in patients with familial hypercholesterolemia: role of illness perceptions. Cardiovasc Drugs Ther. 2004;18:475-81

Glossary:

1. LDL-C: Low Density Lipoprotein-C
2. ASCVD: Atherosclerotic Cardiovascular Disease
3. CTT: Cholesterol Treatment Trials
4. WHO: World Heart Organization
5. HDL-C: High Density Lipoprotein-C

6. HMG-CoA: Hydroxymethylglutaryl CoA
7. CHD: Coronary Heart Disease
8. CRT: Cluster Randomized Trial
9. ASHD: Atherosclerotic Heart Disease
10. ITS: Interrupted Time Series