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Commentary

Teaching Medical Students Risks of Direct-to-Consumer Medical Marketing Using Problem Based Learning

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Introduction

The Direct-to-Consumer (DTC) medical marketplace is a rapidly growing industry.[1-8] Especially with the expansion of the Internet, patients now have access to a growing body of medical information, testing, and pharmaceuticals without the oversight or prescription of physicians.[1-8] Furthermore, the online DTC medical marketplace represents an, as yet, unfettered forum for vendors to offer unproven testing and illicit pharmaceuticals without regulation as to the nature or content of advertisements or products offered.[1-8] As patients access DTC medical marketplace services and are subject to unregulated online advertisements for various medical products, it is clear that physicians will be called upon to educate patients about this marketplace as well as its potential benefits and risks. We offer a model of introducing medical students to the DTC medical marketplace in a problem-based learning (PBL) forum whereby students are provided the opportunity to learn about the marketplace while studying a case based upon a real patient. This provides an opportunity to discuss the implications, risks, benefits, and potential impact on patient-physician relationships of this unregulated and rapidly emerging industry.

The DTC Medical Marketplace

The DTC medical marketplace currently represents a rapidly expanding industry from which patients can purchase a growing number of pharmaceuticals and medical testing products peripheral to physician oversight or prescriptions.[1-8] To date, studies have been published regarding the DTC availability of medical testing for cardiac, oncologic, genetic, and sleep apnea disease screening.[1-8] Patients are able to access any number of imaging technologies for full body scans, lung scans, heart scans, 3D fetal scans, and more without the prescription of a physician. Finally, a growing online medical marketplace for DTC illicit pharmaceuticals is posing serious risks for many patients and consumers.[5-7]

There are several potential dangers of this DTC medical marketplace that should be considered by current and future physicians. First, this DTC medical industry does not participate in informed consent discussions, provide follow-up care for patients, or filter the appropriateness of patients purchasing their screening tests.[1-6] This industry does, however, engage in offering many medical screening tests that are not supported by evidence-based guidelines and may therefore be exposing patients to more harm than benefit.[1-6] For example, some companies offer coronary calcium screening to the general population.[1] However, evidence based guidelines advise against using this screening test in individuals with a low Framingham Risk score.[9]

Accordingly, physicians are faced with the downstream consequences of patients arriving at their office visits with abnormal results of DTC medical testing. Under these follow-up circumstances, physicians are confronted with the need to understand testing results, the utility of tests performed, and decisions for further management. Many tests performed by DTC medical testing companies are unproven and/or of suboptimal accuracy,[1-4] which means that a physician will be placed in the position of at least repeating testing and, at

worst, pursuing further diagnostic testing or treatment for patients that may or may not be necessary. Arguably, this represents an unnecessary tax on patients, physicians, and third-party payers.

Furthermore, patients may be subjected to online advertisements for these medical screening tests, such as heart scan screening, and request advertised testing from their physicians looking to save out of pocket costs. This represents not only a risk to patients potentially undergoing unproven testing but it also poses a challenge for physicians to effectively educate patients about risks, benefits, and utility of various advertised testing. More challenging, perhaps, physicians will be confronted with balancing responsible use/denial of requested testing while also maintaining high patient satisfaction, which is an important metric in the quality of provided care.[10] Consequently, physician time is now subject to being directed away from customary practices and toward the time required to help patients understand why various advertised medical screening tests may or may not be indicated in their specific circumstances.

Another particularly serious risk emerges when patients access the DTC medical marketplace for self-diagnosis and self-treatment for symptoms of disease. Patients who do not wholly understand the difference between screening and diagnostic testing may seek screening tests for symptom diagnosis. These patients can dangerously be falsely reassured by normal results if they have chosen the wrong test. Further, patients lacking understanding of medical diagnosis intricacies may self-diagnose and self-treat, leading to a delay in effective diagnosis and treatment with a medical professional. Particularly with the availability of pharmaceuticals online without physician prescriptions, patients are at high risk of exposing themselves to unnecessary and potentially dangerous treatments.[5-6]

Finally, separate from the ordinary risks of self-diagnosis and self-treatment, studies have highlighted the presence of counterfeit pharmaceuticals on the Internet.[5-6] So, even for patients who have been prescribed a medication by their physicians but are looking to reduce their pharmaceutical costs, there is a danger of encountering counterfeit pharmaceuticals online that may cause grave harm. This is especially true for vulnerable populations such as the uninsured or even Medicare beneficiaries who have encountered their “donut hole” period.[7] Illustratively, there was a recent case of a woman who died as a result of counterfeit pharmaceuticals purchased online.[11]

However, despite the significant risks posed by this unregulated DTC medical industry, the mere presence of this marketplace suggests a societal need that is being met in some form. Thus, while it is important to explore the risks of this industry, it is also important to explore the utilities. Potential benefits include improved patient autonomy, greater transparency and competition in care costs, more efficient care delivery, and improved care access. Importantly, patient access to care can be impacted by many issues including lack of insurance, lack of transportation, and time delay in seeing a practitioner. The DTC medical marketplace could potentially mitigate each of these access issues.

Problem-Based Learning and the DTC Medical Marketplace

PBL has been gaining widespread implementation in pre-clinical medical curricula.[12] The PBL forum has been demonstrated as effective in helping students more effectively evolve their critical thinking skills.[13] Indeed, over 70% of medical schools in the United States now implement some form of PBL into their pre-clinical medical school curriculum.[12] Further, PBL represents an

opportunity to discuss issues related to patient care that would otherwise not be encountered in more traditional curricular approaches such as didactics.[14-15] Thus, PBL is an ideal forum to introduce concepts such as the DTC Medical Marketplace.

A usual PBL case spans 2 days. The case is based upon the longitudinal presentation of a patient, their circumstances, and evolving care. The first day of PBL is usually dedicated to introducing the patient, their problem, and a few elements of patient history. Throughout the first day of PBL, students develop "look-ups" based upon outstanding questions not entirely understood at the end of the first day. The look-ups can be case-related questions of physiology, anatomy, pathology, psychosocial issues, medico-political issues, medico-legal issues, or any other case-related issue of interest to the students. Each student within the PBL small group is then assigned a look-up and will report back on the second day of the PBL case to teach their colleagues the information they have each collected to answer their respective questions. Often, look-up presentations will provoke robust discussions about "gray area" issues.[16] This type of learning format consequently presents an important opportunity to introduce students to concepts such as the DTC medical marketplace where they can begin to explore the impact of this industry on their patients' care and patient-physician relationships. We have, indeed, incorporated these concepts into a model PBL case, which resulted in the opportunity for our medical students to evaluate the DTC medical marketplace from the clinical case perspective.

Our particular PBL case is a 2-day case based upon an elderly South East Asian woman with mouth and jaw pain; this case is based upon a real patient seen by one of the authors (SE). From the outset of the case, the patient self-diagnoses her jaw pain as temporomandibular joint (TMJ) pain based upon knowledge she has accumulated on the Internet. Indeed, using the *Google* search engine, searching "jaw pain" returns several pages of TMJ-related informational websites.(Archived by Webcitation at http://www.webcitation.org/65v7VlvYP.**)**
Based upon her self-diagnosis, the patient purchases a custom fitting mouth guard online and pursues self-treatment of her jaw pain over several weeks before ever seeking medical attention for her problem. Again, a simple *Google* search for "TMJ mouth guard" yields immediate access to a panoply of sites selling DTC mouth guards advertised for treatment of TMJ.(Archived by Webcitation at http://www.webcitation.org/66Gw056A6)
However, instead of her symptoms improving with self-treatment for TMJ, the patient develops worsening jaw pain, increased swelling, and further concerning disease symptoms. Ultimately, the patient is found to have a parotid stone with development of parotid abscess and need for subsequent surgical intervention.

As written, our case allows students to explore basic science issues including the head/neck anatomy, microbiology of the oral cavity, differential diagnosis of mouth and jaw pain, among other basic science issues. But further, the format of the case allows the students to explore whether patient self-diagnosis and self-treatment using the online DTC medical marketplace resulted in delayed diagnosis and subsequent harm for this patient, including a cultural overlay (she is an immigrant with a low level of acculturation). This case presents the opportunity for students to collectively answer questions such as, "why did the patient pursue self-diagnosis and self-treatment in lieu of traditional medical care?", "to what extent the patient's culture and lack of familiarity or distrust of Western medicine played a role in her accessing DTC medical products?", "if the patient can purchase a custom mouth guard online, what else might

she be able to purchase to self-treat for medical problems?", "what are the benefits and harms of purchasing DTC medical products online?", "is there any regulatory body overseeing the quality of medical products or advertising available online?", among others.

It is important to note that some opponents of the PBL format offer case-based learning (CBL) as an alternative. Both PBL and CBL are small group formats in which the students explore patient cases and relevant questions.[17] However, the PBL process focuses more on learner goals whereby the facilitator participates minimally in discussion guidance. CBL, on the other hand, provides for a shared responsibility among the learners and facilitator whereby the facilitator guides the discussion and refocuses learners when they are off track.[17] CBL advocates argue that a major drawback to PBL is a relative lack of structure and goal-directed learning, which can often result in faulty conclusions among learners.[17] These CBL proponents maintain that a CBL format more appropriately utilizes facilitators, provides more structure for the learner, and allows for more efficient accumulation of information, while also encouraging an open-exploration of issues.[17] While the case we have presented here pertains specifically to a PBL format, we believe that the lessons learned about the DTC medical marketplace could also be achieved using this case within a CBL format.

Conclusion

The DTC medical marketplace is a rapidly evolving and expanding forum for consumers and patients to purchase medical testing and pharmaceuticals peripheral to physician guidance and care. There are several risks posed by this industry and there may be potential advantages. It is clear that this industry will impact the way we practice medicine moving forward. Thus, it is vitally important that practicing and future physicians are aware that this industry exists and how it might potentially impact patient care, patient safety, and the patient-physician relationship. The PBL forum appears to be an excellent medium to introduce these concepts to preclinical medical students, and allow them to explore the vast implications. The earlier medical students are educated, the more prepared they will be to respond to patient requests and issues related to this DTC medical marketplace beginning in their clinical years. Furthermore, educating medical students now can potentially facilitate the education of their attending and resident physicians in the future.

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