CHILDREN'S SPECIALIZED HOSPITAL

What are concrete motivational tools that change adolescent compliance?

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Adherence to recommendations for behavioral health changes is challenging for all patients, particularly adolescents. External and internal factors during this developmental stage complicate steps towards internalizing the benefits of health management.

Per Cole, Holtgrave, and Rios (1993), external factors are outside influences that shape behavior, such as peer pressure, media messages, economic factors, and environmental stresses. Internal factors are sources of motivation connected to a personal belief that the behavior is important. They include knowledge, core values, and psychological disposition.

Chronic health conditions alone contribute negative, secondary effects on biological, psychological, and social development. Adolescents with chronic illnesses are more likely to have emotional problems, develop psychiatric disorders, struggle with school attendance, and face restricted independence from family, issues whose risks are already heightened by adolescence (Suris, Micaud & Viner, 2004). Motivational factors that discourage adherence to self-care practices further exacerbate chronic conditions and can disempower adolescents as they transition to independent adulthood, burdening parents who face the competing challenges of their children's long-term care and their own aging.

Despite the relevancy and importance of health management, some adolescents may not recognize an urgency to change behaviors nor understand that current habit development has a worthwhile impact on life-long health (Bryan et al., 2016). The present research identifies evidence-based analyses of both external and internal factors that may stimulate adolescent motivation towards health promoting practices.

External Factors

External factors tend to be most effective in stimulating immediate action, though impacts are weak long-term. However, it is possible to use external factors as an impetus for developing internal motivation.

With the popularization of mobile technology-based health interventions, such as FitBit, Sweet Talk, and txt2stop, there is potential to make behavioral health change more convenient. However, Free et al. (2013) reviewed 85 studies investigating their effectiveness, and found that technology-based interventions for diabetes, diet, or physical activity showed little to no effects on adherence to disease management and on motivation towards health behavior change. All six medication adherence interventions reported no benefits of technological reminders. Out of 13 diabetes management interventions, only one trial, involving 34 Type II diabetes patients, reported a clinically significant reduction (>1%) in HbA1c. While the majority of the diabetes-related technology analyzed involved text message reminders or health monitoring apps, the outcome measurements used across trials varied, from blood glucose and insulin dose to blood pressure, lipid profile, and weight, which makes generalizing efficacy difficult. It is also important to note that few studies involved adolescent subjects, and the prevailing role of technology in adolescent lifestyles may challenge the authors' findings.

Diabetes-related technology were also investigated by Wong et al. (2017) in a trial of whether financial incentives increased Type II diabetes glucose monitoring adherence and glycemic control in ninety adolescents and children, aged 14 – 20. The experimental group received $60 at the start of the intervention. If the participants did not meet their daily blood glucose monitoring goals, researchers deducted $2 from their original $60 balance. Participants

exposed to the experimental condition were two times as likely to adhere to blood glucose monitoring. HbA1c was valued after three months of the intervention and at a six month follow-up, however, no difference was noted between the experimental and control groups; therefore, findings suggested that increased glucose monitoring did not correlate with improved glycemic control. Wong et al. (2017) support the potential of financial incentives in promoting management of other chronic diseases among youth, particularly because youth tend to be financially dependent on others. Despite the evidence, however, implementation of financial incentives would be short-lived, if not unrealistic. Alternatively, adolescents could be incentivized by the loss or gain of privileges, such as an extended curfew.

Individual performance competition may also be a more clinically feasible strategy for eliciting motivation. In Germany, Studer, Dijk, Handermann, and Knecht (2016) tested the effect of competition on self-directed training among elderly, mostly male, neurorehabilitation patients. Competition theoretically increases an activity's intrinsic benefit, appeals to a desire to win, and may motivate effort to avoid regret or associated reductions in social status due to loss. Secondary effects of competition, such as anxiety and pressure, may also boost behavior and performance, so long as the patients believe they have the ability to win and that the outcome depends upon their effort level. Training performance indicators, such as duration and speed, were measured after conditions of 1) no competition, 2) no competition with therapist feedback, and 3) competition against an anonymous opponent. The order of the three conditions was randomized and all subjects were exposed to each condition a minimum of two times. Studer et al. (2016) demonstrated that a competition setting elicited a higher intensity of self-directed training and even greater training performance during rematch competitions. In clinical applications, patients exhibiting positive and constructive responses to competition may

approach behavioral change goals more enthusiastically when facing a fictitious, anonymous opponent of equal health condition, sex, and age.

Currently within the Children's Specialized Hospital Chronic Illness Management Program (CIMP), a secondary intention of holding team feedback meetings, which involve groups of CIMP patients and the CIMP clinician team, is to encourage peer motivation and accountability. Constructive competition against a fictitious patient or oneself could also be implemented to gamify health. Answering jeopardy questions about disease management knowledge or competing against a personal record for timed carbohydrate-to-insulin calculations are examples for consideration.

The aforementioned studies are generalizable to a wider range of patient populations, and it is important to note unique incentives among adolescents. Literature on adolescent motivation primarily focuses on analyzing the origins of dangerous adolescent health behavior and evaluating preventative initiatives. Steinberg (2015) published a research article summarizing current efforts to prevent risky behavior among American adolescents. Most are based in classroom health education, which has been shown to be largely ineffective in preventing smoking, drinking, and unsafe sex. The assumption that knowledge will alter behavior is not always the case, especially among adolescents, whose behaviors are driven by other factors. That is, education alone might not be the most effective way to inhibit unhealthy behaviors among this population. An underdeveloped sense of self-control, increased risk-taking, and reward-seeking drivers are often inherent features of adolescence. Steinberg proposes to limit risky behavior by changing physical environments and public policies to help reduce the opportunities for immature judgment. For example, poor mental health exacerbated by sleep deprivation can be addressed by structuring adolescents' schedules to encourage more sleep. A decreased

prevalence of retail outlets is associated with decreased underage drinking. Similarly, pediatric patients learning to manage their chronic disease could increase adherence to their treatment plans when environmental temptations to deviate are limited. Patients with diabetes are more likely to follow nutrition recommendations when foods outside of their diabetic diet are not found in their homes.

Physical and social environments can also change to become more conducive to positive personal control. Redirecting the desire to be self-sufficient towards a specific health-promoting goal and providing opportunities to achieve it independently can be productive. Vansteenkiste, Simons, Lens, Sheldon, and Deci (2004) conducted three field experiments with high school and college students to test the impacts of intrinsic versus extrinsic goals and autonomy-supporting versus controlling environments on student learning.

Intrinsic goals are associated with human nature and needs, including relationships, growth, and health, while extrinsic goals are related to external indicators of worth, such as wealth, status, or fame. Autonomy-supporting environments minimize the presence of external control, threats, and pressure. Compared to controlling environments, where rewards, punishments, and deadlines are used, autonomy-supporting environments have been found to facilitate internal motivation to learn.

Vansteenkiste et al. (2004) observed a synergistic effect between intrinsic goals and autonomy-supportive learning environments that resulted in the greatest learning, dedication, and engagement among students. Possible mediators for these effects may be the lack of feeling forced to learn and the congruence between pursuing an intrinsic goal and having the environmental support to do so. In the context of chronic illness management, it is important to

not only educate caregivers, but to also encourage them to foster a supportive social environment regarding self-care. Furthermore, making a patient's physical environment more conducive for autonomous efforts can improve disease management adherence, so long as the patient recognizes self-efficacy, the self-confidence in the ability to carry out a behavior, and identifies internal motivation to invest in their health.

Internal motivation can enhance the effects of external factors; however, they do not always exist in patients prior to environmental changes. There is potential to elicit internal motivation from patients through external factors. In relation to social environmental change, Mokhtari et al. (2017) found that overweight and obese adolescents reported greater controlled motivation and perceived competence for healthy eating behaviors regardless of socioeconomic factors. This finding was supported by higher agreement among overweight and obese participants to the statements "feel pressure from others to do so" and "want others to see I can do it" regarding motivation to eat healthily when compared to normal weight participants. In contrast to controlled motivation, which is derived from external influences, autonomous motivation was found to be equal among all participants, regardless of weight. Autonomous motivation is more likely to produce long-term behavior change, yet controlled motivation is more influential among adolescents, possibly due to their greater vulnerability to environmental influences and social desirability. Mokhtari et al. (2017) recommended utilizing external feedback from family, friends, and physicians to more effectively limit unhealthy behaviors. Positive feedback to decrease unhealthy practices may encourage greater self-confidence to drive sustainable health behavior changes that continue through adulthood.

Behavioral modeling is another social influence strategy with potential to elicit motivation to change. Bjelland et al. (2011) conducted an eight month process assessment of

HEalth in Adolescents (HEIA). HEIA is a study intended to evaluate a school-based, healthy weight development intervention program among sixth graders across 37 Norwegian schools. Bjelland et al. (2011) found that all girls exposed to the intervention spent less time watching TV/DVD and consuming sugar-sweetened beverages, but boys exposed to the intervention demonstrated no behavioral changes. The authors argued that the gender of those facilitating and implementing the intervention (e.g. researchers) might have been a factor. For example, over 80% of parents involved were mothers, and both teachers and researchers were mostly women. It is possible that the effects observed in the girls were impacted by the presence of more female role models. Identifying with the role model appears to be a valuable component of behavioral modeling.

Additionally, adolescents may be more responsive towards peer models as compared to healthcare providers, teachers, and even parents. Education and personal stories from peer mentors, whether students or previous patients, may resonate with current patients more effectively. In addition to sharing educational videos and health-related games, KidsHealth has produced personal stories from peers with asthma and diabetes that are accessible through GetWellNetwork. “Senior” CIMP patients are encouraged to welcome new patients informally, yet potential for formal peer-advising opportunities exist. Pairing newly admitted with week four patients for CIMP team feedback meetings could be an opportune time for experienced patients to receive recognition for their progress and give advice to new patients. Assigning a senior patient the responsibility of mentorship could draw forth a greater sense of responsibility over personal disease management.

Internal Factors

As effective as environmental and social influences are suggested to be, appealing directly to adolescent values can encourage autonomous motivation without the mediation of extrinsic factors. Bryan et al. (2016) conducted a randomized, controlled trial to examine the effects of aligning healthy eating education with three adolescent values: autonomy, social justice, and social status. The authors define social justice as a heightened concern about unfairness and reactance against unfair authorities; social status is having value and respect among peers. Over two years, 536 eighth grade students were assigned one of three conditions: 1) no treatment, 2) a traditional public health message endorsed by adult authority figures, or 3) an experimental message endorsed by peer adolescents that framed food companies as deceptive and unjust.

Results showed that the experimental intervention significantly increased the construal of participants' perceptions of healthy eating as consistent with autonomy, social justice, and social status. The effects of the intervention on healthy eating behavior was claimed to be nutritionally significant due to an overall decrease in junk food selections the following day. Traditional health education was found to be just as ineffective as no treatment on motivating health behavior change. Contrary to popular pessimism among experts, the researchers revealed that a "values harnessing" approach to designing health education can motivate short-term behavior change when offering immediate, relevant benefits to its audience. Though the study focused on internal-motivation, the use of peer endorsement clearly demonstrates that extrinsic and intrinsic incentives are not mutually exclusive but complementary.

Demonstrating the ability to care for oneself can manifest into tangible, mature privileges, such as attending college, obtaining a driver's license, or extending curfew, that represent highly prioritized, internal values, such as independence. Framing clinical recommendations with adolescent values in consideration is likely to stimulate behavior change.

Conclusion

Both external and internal factors, when used separately or in conjunction, have potential to elicit motivation towards behavioral health change among adolescents. Competition, peer-led education or modeling, immediate rewards, and environmental restructuring are possible strategies for healthcare professionals to consider.

Specifically within the CIMP program at Children's Specialized Hospital, suggestions to implement include gamifying disease management knowledge and skills, formally establishing peer mentorships, and maximizing the educational and motivational potential of available technology, such as prescribing testimonial and educational videos to watch on GetWellNetwork.

While other children's hospitals, including Mount Sinai Kravis Children's Hospital and Children's Hospital of Philadelphia, experience success with video entertainment for therapeutic purposes, additional research about educational entertainment and patient outcomes is needed. Pediatric populations should also be more involved in studies on the role of mobile technology-based tools related to disease management. Future studies may also examine the impact of competition between teams and the loss or gain of privilege incentives on motivation.

References:

Bjelland, M., Bergh, I.H., Grydeland, M., Klepp, K.I., Andersen, L.F., Anderssen, S.A., Ommundsen, Y., Lien, N. (2011, Jun 17). Changes in Adolescents' Intake of Sugar-Sweetened Beverages and Sedentary Behaviour: Results at 8 month mid-way assessment of the HEIA study – a Comprehensive, Multi-Component School-Based Randomized Trial. *International Journal of Behavioral Nutrition and Physical Activity, Vol. 8(63).* doi: 10.1186/1479-5868-8-63

Bryan, C.J., Yeager, D.S., Hinojosa, C.P., Chabot, A., Bergen, H., Kawamura, M., Steubing, F. (2016, Sept 27). Harnessing Adolescent Values to Motivate Healthier Eating. *Proceedings of the National Academy of Sciences of the United States of America, Vol. 113(39), 10830-10835.* doi: 10.1073/pnas.1704586113

Cole, G.E., Holtgrave, D.R., Rios, N.M. (1993). Internal and External Factors that Encourage or Discourage Health-Relevant Behaviors. *Oak Ridge Institute for Science and Education.* Retrieved from https://www.orau.gov/cdcynergy/soc2web/Content/activeinformation/resources/Health_Behavior_Factors.pdf

Free, C., Phillips, G., Galli, L., Watson, L., Felix, L., Edwards, P., Patel, V., Haines, A. (2013, Jan). The Effectiveness of Mobile-Health Technology-Based Health Behaviour Change or Disease Management Interventions for Health Care Consumers: A Systematic Review. *PLOS Medicine, Vol 10(1).* doi: 10.1371/journal.pmed.1001362

Mokhtari, S., Grace, B., Pak, Y., Reina, A., Durand, Q., Yee, J.K. (2017, Nov 10). Motivation and Perceived Competence for Healthy Eating and Exercise Among Overweight/obese

Adolescents in Comparison to Normal Weight Adolescents. *BioMed Central Obesity, Vol 4(36).* doi: 10.1186/s40608-107-0172-2

Steinberg, L. (2015). How to Improve the Health of American Adolescents. *Perspectives on Psychological Science, Vol. 10(6), 711-715*. doi: 10.1177/1745691615598510

Studer, B., Dijk, H.V., Handermann, R., Knecht, S. (2016). Increasing Self-Directed Training in Neurorehabilitation Patients Through Competition. *Progress in Brain Research, Vol. 229, 367-388.* doi: 10.1016/bs.pbr.2016.06.012

Suris, J.C., Michaud, P.A., Viner, R. (2004). The Adolescent with a Chronic Condition. Part I: Developmental Issues. *Archives of Disease in Children, Vol 89: 938-942.* doi: 10.1136/adc.2003.045369

Vansteenkiste, M., Simons, J., Lens, W., Sheldon, K.M., Deci, E.L. (2004). Motivating Learning, Performance, and Persistence: The Synergistic Effects of Intrinsic Goal Contents and Autonomy-Supportive Contexts. *Journal of Personality and Social Psychology, Vol 87(2): 246-260.* doi: 10.1034/0022-3514.87.2.246

Wong, C.A., Miller, V.A., Murphy, K., Small, D., Ford, C.A., Willi, S.M., Feingold, J., Morris, A., Ha, Y.P., Zhu, J., Wang, W., Patel, M.S. (2017, Oct 23). Effect of Financial Incentives on Glucose Monitoring Adherence and Glycemic Control Among Adolescents and Young Adults with Type 1 Diabetes. *The Journal of the American Medical Association Pediatrics, Vol. 171(12), 1176-1183.* doi: 10.1001/jamapediatrics.2017.3233