

**Increasing Referral Rates to the Diabetic Educator at Time of Diabetes Diagnosis**

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### Abstract

**Problem:** The American Diabetes Association (ADA) recommends that formal education is provided by a certified diabetic educator to all adults newly diagnosed with type 2 diabetes. A local primary care clinic in Maryland has a diabetic educator available to patients. Despite this resource and ADA recommendations, this clinic has a low number of referrals to the diabetic educator compared to their sister location. From October 11, 2021, to February 22, 2023, the clinic had 116 referrals to the educator, compared to 274 referrals entered at the sister location.

**Purpose:** The purpose of this quality improvement (QI) initiative is to use an implementation bundle, including a written policy and a referral order panel to support the ADA guidelines at the clinic. Education, reminders, as well as audit and feedback were included in the bundle.

**Methods:** The new policy was written by the project lead based on the ADA guidelines and then approved by the clinic's manager. Once the policy was in effect, education on the ADA guidelines and the policy were provided to the staff members. A referral order panel was added to the providers' preference list. The order panel included referral orders to the diabetic educator, ophthalmology, and podiatry. Biweekly feedback was provided to the staff after one month of initiation to ensure provider adherence to the project.

**Results:** Weekly chart audits were conducted by the project lead. A month prior to project implementation, only 40% of newly diagnosed patients were referred to the educator. After one month of the initiative, the referral rate increased from 0% in the first week to 83% in the last week. By the end of the project, 100% of newly diagnosed patients were referred to the educator.

**Conclusions:** A combined intervention using a protocol, order panel, and audit with feedback increased referral rates to the diabetic educator at the local clinic. Using a multi-faceted approach was successful at modifying provider behavior and implementing guidelines into practice.

### **Increasing Referral Rates to the Diabetic Educator at Time of Diabetes Diagnosis**

Diabetes and diabetes-related health complications can be serious and costly. Each year, \$237 billion is spent on direct medical costs for diabetic patients (ADA, 2021). Education is essential for diabetic patients to manage their condition at home and to prevent complications. Formal education, such as diabetes self-management education (DSME), has shown to be a cost-effective intervention to reduce hospital admissions as well as readmissions (ADA, 2021). DSME has been shown to significantly reduce hemoglobin A1c (HbA1c) within a 12-week period (Yu et al., 2022). Based on these benefits, the American Diabetes Association (ADA) recommends that DSME be provided at the time of diagnosis, annually, with transition in care, and when a change in health status has occurred (ADA, 2021). The objectives of Healthy People 2030 also emphasize the importance of diabetic formal education for diabetic patients. One of their missions is to increase the proportion of the diabetic population who are formally educated on diabetes at a national scale from 51.7% to 55.2% by the year 2030. (USDHHS, 2019).

A local primary care clinic in Maryland serves a large uninsured patient population with type II diabetes mellitus. Data from the clinic indicates that provider referral rates to the diabetes educator are low despite the ADA guidelines and the Healthy People objectives. From October 11, 2021, to February 22, 2023, the clinic had 116 referrals to the diabetes educator, compared to 274 referrals from their sister location. The clinic has more providers and patients compared to their sister location. Due to time constraints during patient visits (20-25minutes), providers are unable to provide the necessary education related to diabetes and nutrition during the visit. The clinic is fortunate to have a diabetic educator available on site for patients upon referral to provide proper DSME. However, this resource is not consistently used at the time of a patient's

diagnosis and is often reserved for when patients are struggling to manage and control their blood glucose at home.

There are various other factors which have been noted to impact providers' action to refer, such as, the lack of a standardized process at the clinic, lack of technological support, patient characteristics, and staff lack of awareness of the ADA recommendations. Originally, there was no written policy indicating when to refer patients and no clinical decision support tool in the electronic health record to facilitate ordering referrals. The purpose of this quality improvement (QI) initiative was to use an implementation bundle to reinforce ADA guidelines at the clinic. The implementation bundle is a multifaceted approach tailored to the clinic with a written policy, referral order panel, education, reminders, as well as audits and feedback. The main goal of the project was to increase referral rates to the diabetic educator in patients newly diagnosed with type 2 diabetes to 70% within 15 weeks.

### **Available Knowledge**

An evidence review was conducted, and seven articles demonstrated the impact of diabetes education at the time of diagnosis on reducing patient's A1C levels. Five of the seven articles were randomized controlled trials (Chai et al., 2018; Yu et al., 2022; Surucu et al., 2017, Singh et al., 2022, Parmar et al., 2018). All five articles demonstrated a significant reduction in A1C levels in the educational groups compared to the control groups. Additionally, Tanaka et al. (2021) conducted a systematic review and identified the effectiveness of DSME among adults within 12 months of diagnosis of type 2 diabetes mellitus in improving glycemic control. A 2020 review of randomized control trials and mixed method studies by Olsen et al. noted that DSME improved glycemic control. Three of the seven articles from the literature review demonstrated

other benefits to diabetes education including increasing patients' knowledge and improving self-care (Parmar et al., 2018, Yu et al., 2022, Singh et al., 2020).

Another literature review was conducted to determine which interventions would successfully promote provider adherence to the ADA guidelines and increase the number of referrals to the educator at the time of diagnosis. Seven systematic review articles were found from the literature review (Shanbhag et al., 2018; Zoubi et al., 2018; Tomasone et al., 2020; Bora et al., 2023; Uwizeye et al., 2022; Liu et al., 2022; Pedersen et al., 2018). The most reported successful interventions in these articles were education, audit and feedback, reminders, medical record system changes, and policies/protocols. All seven studies reviewed audit and feedback, reminders, and education. The educational component in the articles discussed training, meetings, and printed materials. Six of the seven articles suggested the success of a multifaceted approach in implementing of guidelines and increasing provider adherence (Shanbhag et al., 2018; Zoubi et al., 2018; Tomasone et al., 2020; Bora et al., 2023; Uwizeye et al., 2022; Pedersen et al., 2018). Two of the eight articles discussed the positive impact of medical record system changes and policy changes on improving physician behavior as well (Shanbhag et al., 2018; Pedersen et al., 2018). After conducting the literature review, the interventions were reviewed to determine their feasibility at the clinic. The interventions that were most feasible were selected for this initiative and were made part of the implementation bundle.

### **Rationale**

To guide the implementation process, the Promoting Action on Research Implementation in Health Services (PARiHS, 2021) framework was used. The PARiHS framework states that successful implementation of research into practice is the function of the relationship between the nature of the evidence, context in which the change is implemented, and the way by which

the change is facilitated (NCCMT, 2021). The nature of the evidence includes research, patient experiences, and clinical experiences. For this project, the evidence demonstrates the benefits of formal education at the time of diagnosis, and the significance of using multifaceted approaches to improve adherence to guidelines for staff. Positive experiences from providers and patients with DSME contribute to the strength of the evidence. In addition to the nature of the evidence, the clinic (context) needs to be supportive of any changes to be a success. In this case, the clinic has adequate resources to sustain changes, such as an educator on site and electronic health records (EMRs). To facilitate the process, several stakeholders were recruited, including the clinic manager, lead physician, and nurse informaticians. Based on the PARIHS framework, the interventions were expected to succeed due to the strong nature of the evidence, strong context, and high level for facilitation.

Other contextual elements of the clinic were considered prior to the selection and introduction of the interventions. The elements were the clinic's culture, climate, and resources. While considering the elements, it was determined the culture of clinic was patient centered with a focus on evidence-based practice. The clinic was open to adopting best practices based on evidence to improve patient care. The staff members work effectively as a team. The staff members feel comfortable asking each other questions and working together to benefit the patient. The clinic has adequate resources for the DSME sessions to take place after referrals to the diabetic educator were made. There is an assigned certified diabetes educator for the clinic that provides educational sessions at least once a month in both Spanish and English. There is ample space for classes to be conducted, and enough materials for patients, such as handouts, to be distributed to patients.

An assessment of the processes and structures related to ordering the referrals to the educator were evaluated. The referral process starts when a patient visits the provider and a history and physical are conducted. After this initial step, the providers determine if the patient needs an A1C and other labs to be drawn. If the A1C result is greater than 6.5% and the patient meets the ADA criteria, a diabetes diagnosis is then entered in the EMR. Instead of referring to the diabetic educator at the time of diagnosis, providers will wait to refer. The referral is usually ordered when the A1c is not well controlled. After the referral is made, the diabetic educator and coordinating staff view the referral and call the patient to follow up with class sessions. The structural assessment revealed the lack of a written policy or protocol related to the referral process. From the assessment it was determined that implementing a written policy might improve diabetic referral rate overall.

### **Methods**

To increase referral rates to the diabetic educator, an implementation bundle was used at the clinic. The bundle included a referral order panel, a standardized protocol, staff education, and provider feedback. To ensure success of these interventions, a formal implementation plan was established prior to the project with a timeline, goals, and strategies. The quality improvement project took place over a 15-week period. The standardized policy was written by the project lead based on the ADA guidelines. The policy was then reviewed, approved, and implemented by the clinic's manager. On the policy's effective date, a meeting was held to educate staff on the policy as well as ADA guidelines. To ensure all staff receive education and verbalized understanding, they were tallied without identifiers. Staff were provided with the policy via email and handouts in person for quick reference.

The order panel was then added to each of the providers' preference list within the EMR by the project lead. The referral order panel had referrals to the diabetic educator, ophthalmology, and podiatry. To have 100% of the providers at the clinic adopt the referral order panel, the project lead worked one on one with each of the providers to create the order panel. The goal of using the referral order panel was to facilitate ordering referrals for newly diagnosed patients and improve provider workflow when ordering the referral for the educator. A biweekly audit and feedback were initiated after the first month to further improve referral rates and provider adherence.

To study the processes of the quality improvement project, the number of providers who adopted the referral order panel and the number of providers who verbalized understanding of the ADA recommendations were tallied (without identifiers). To measure the outcome goal, the referral rates were measured weekly by calculating the number of newly diagnosed patients referred to the diabetic educator divided by the number of newly diagnosed diabetic patients for that week times 100 percent. The project lead conducted weekly chart audits to determine the referral rates for the week. The referrals rates from week one to week fifteen were plotted on a run chart to illustrate change overtime. This facilitated the visualization of trends or patterns in the process. The median of the data points was graphed as a horizontal line through the chart at the conclusion of the project. The total number of patients in the project was calculated at the end of the project. The percentages of those patients referred to the educator and those not referred were displayed in a pie chart.

The clinic uses their parent organization's Institutional Review Board (IRB) Office for regulatory oversight. For the quality improvement project, a checklist was completed, signed, and emailed to the IRB for clearance prior to the project start date. In addition, Non-human



Subject's Research determination from the Human Research Protections Office (HRPO) of the University of Maryland School of Medicine Institutional Review Board (IRB) was obtained. To protect staff identity, no provider identifiers were used. Patient data security was considered and protected when collecting data. Data were collected in a private area of the clinic only accessible to staff and was entered into RedCap, a password protected data collection program.

### **Results**

The clinic staff had 4 providers for adult patients (2 family nurse practitioners, and 2 physicians) who participated in this quality improvement project. All the providers adopted the referral order panel and received education on the ADA guidelines as well as the new policy. Two of the providers were able to attend the meeting to discuss the policy and the guidelines. The other two providers received education in between patient care due to scheduling constraints. All the providers verbalized understanding after receiving education. The providers were also given handouts of the policy changes and of the ADA guidelines during the educational meetings.

One month prior to the implementation of these interventions the referral rate to the diabetic educator was at 40% for the newly diagnosed patients. After implementation, weekly referral rates ranged from 0% to 100% from week 1 to week 15. The median weekly percentage of patients referred was 79%. During the first month of the initiative, the referral rate increased from 0% in the first week to 83% in the last week of the month. However, the rate did drop down to 50% by the end of the fifth week.

Audits and provider feedback were initiated during week 5 to remind the staff to continue referring newly diagnosed patients to the educator. Laminated cards with ADA guidelines were

also provided during week 5. After week 5, the weekly referral rates remained close to the goal of 70% and higher. After week 11, the weekly referral rates remained at 100%. There were no new diagnoses during week 13. From week 1 to week 15, thirty-nine patients were newly diagnosed with type II diabetes. Of the thirty-nine patients, twenty-six of the patients were referred to the educator (67%) and thirteen of the patients were not referred (33%).

### **Discussion**

The results from this quality improvement project demonstrated the benefits of using an implementation bundle to support ADA guidelines in the primary care clinic. The use of education, policy adoption, referral order panel, and audit and feedback overall increased the number of referrals to the educator for newly diagnosed diabetic adults. The incorporation of audit and feedback had a greater impact on provider's adherence to the guidelines and on referral rates. These interventions were feasible to implement because they required no additional costs to the clinic. To sustain these results, the office will keep the policy in effect and the referral order panel will be maintained on the providers' EMR lists. These are simple interventions that can be potentially implemented in other clinic settings with EMRs. Audit and feedback as an intervention has spread potential for organizations with EMRs that create reports. The reports can be shared during staff meetings or sent via email by managers as needed to maintain adherence to guidelines.

The usage of multiple interventions to increase provider adherence of guidelines is consistent with the literature reviewed. Most of the systematic reviews recommended using multiple interventions for success. Although the articles supported a multifaceted approach, the review by Liu et al. (2022) found a variety of results and were not able to conclude whether multiple interventions would sustain adherence to guidelines. Bora et al. (2023) and Pederson et

al. (2018) recommended implementing tailored interventions to the practice site for more favorable provider outcomes. The interventions were tailored for this site and may need to be adjusted for other sites. Like the literature, audit and feedback were superior interventions to increase provider adherence to guidelines. The systematic review conducted by Tomasone et al. (2020) they found audit and feedback had greater adherence to evidence-based practice than education alone.

There were several limitations and obstacles to this quality improvement project that should be acknowledged. First, the sample size of the project was small with only thirty-nine diabetic patients. In addition, the study was conducted in one primary care clinic in a specific geographic location, limiting the generalizability of the results. The clinic has resources available to them that not every other clinic has access to, such as, a diabetic educator on site and EMR. Other obstacles to the project included staff motivation, staff adherence, and workflow. A few of the staff members were not motivated to adopt the order panel originally. Once they learned recommended referrals for best practice could be added at the same time, the providers were more amenable to changes. Adherence to the guideline was another obstacle during the first month of the project, so laminated cards with the ADA guidelines were distributed along with provider feedback. Emails with reminders were also sent to staff not sending referrals.

### **Conclusion**

To increase the referrals to the diabetes educator, this quality improvement project required interventions to translate the ADA guidelines into practice. Translating evidence-based guidelines and recommendations has gained new attention in healthcare resulting in implementation science. The interventions used in the implementation bundle for this project included education, policy implementation, referral order panel, and audit and feedback. The

implementation bundle resulted in an increase in referrals at the clinic. The usage of multiple interventions is a potentially cost-effective approach that can be implemented in similar primary care settings to incorporate guidelines into practice. These are cost-effective and sustainable interventions for clinics with EMRs. Future quality improvement projects can be done to identify other facilitators for provider adherence to guidelines such as EMR alerts.

### References

- American Diabetes Association. (2021). Diabetes self-management education. Diabetes Self Management Education | American Diabetes Association. Retrieved January 14, 2023, from <https://www.professional.diabetes.org/diabetes-self-management-education>
- Bora, A., Piechotta, V., Kreuzberger, N., Monsef, I., Wender, A., Follmann, M., Nothacker, M., & Skoetz, N. (2023). The effectiveness of clinical guideline implementation strategies in oncology—a systematic review. *BMC Health Services Research*, *23*(1), 1–15. <https://doi.org/10.1186/s12913-023-09189-x>
- Chai, S., Yao, B., Xu, L., Wang, D., Sun, J., Yuan, N., Zhang, X., & Ji, L. (2018). The effect of diabetes self-management education on psychological status and blood glucose in newly diagnosed patients with diabetes type 2. *Patient Education and Counseling*, *101*(8), 1427–1432. <https://doi-org.proxy-hs.researchport.umd.edu/10.1016/j.pec.2018.03.020>
- Liu, X.-L., Wang, T., Tan, J.-Y., Stewart, S., Chan, R. J., Eliseeva, S., Polotan, M. J., & Zhao, I. (2022). Sustainability of healthcare professionals' adherence to clinical practice guidelines in primary care. *BMC Primary Care*, *23*(1), 1–17. <https://doi-org.proxy-hs.researchport.umd.edu/10.1186/s12875-022-01641-x>
- National Collaborating Centre for Methods and Tools (NCCMT). (2021). *PARIHS framework for implementing research into practice*. NCCMT. Retrieved April 3, 2023, from <https://www.nccmt.ca/knowledge-repositories/search/85>
- NHS Education for Scotland. (2023). *Quality Improvement Zone*. Learn. Retrieved April 3, 2023, from <https://learn.nes.nhs.scot/3048/quality-improvement-zone/qi-tools/run-chart>
- Olesen, K., Folmann Hempler, N., Drejer, S., Valeur Baumgarten, S., & Stenov, V. (2020).

- Impact of patient-centered diabetes self-management education targeting people with type 2 diabetes: an integrative review. *Diabetic Medicine*, 37(6), 909–923. <https://doi-org.proxy-hs.researchport.umd.edu/10.1111/dme.14284>
- Parmar, V., Patel, S., & Iyer, C. (2018). Effect of counseling on newly diagnosed Type 2 diabetes mellitus patients visiting a tertiary care hospital: A randomized control trial. *Indian Journal of Community Medicine*, 43(3), 244–245. [https://doi.org/10.4103/ijcm.IJCM\\_61\\_18](https://doi.org/10.4103/ijcm.IJCM_61_18)
- Shanbhag, D., Graham, I. D., Harlos, K., Haynes, R. B., Gabizon, I., Connolly, S. J., & Van Spall, H. G. C. (2018). Effectiveness of implementation interventions in improving physician adherence to guideline recommendations in heart failure: a systematic review. *BMJ Open*, 8(3), e017765. <https://doi.org/10.1136/bmjopen-2017-017765>
- Singh, F. H. D., Islam, F., Shaikh, A., Pathak, R., Kohli, S., & Kashyap, V. (2022). A Randomized controlled trial to assess the effectiveness of group-based Diabetes Self-Management Education (DSME) program on glycemic control and self-care activities among type-2 diabetics in South-East Delhi. *Indian Journal of Community Health*, 34(3), 402–407. <https://doi-org.proxy-hs.researchport.umd.edu/10.47203/IJCH.2022.v34i03.015>
- Surucu, H. A., Kizilci, S., & Ergor, G. (2017). The Impacts of Diabetes Education on Self Care Agency, Self-Care Activities and HbA1c Levels of Patients with Type 2 Diabetes: A Randomized Controlled Study. *International Journal of Caring Sciences*, 10(1), 479–489. <http://survey.hshsl.umaryland.edu/?url=https://search-ebshost-com.proxy-hs.researchport.umd.edu/login.aspx?direct=true&db=rzh&AN=123010479&site=eds-live>

- Tanaka, R., Shibayama, T., Sugimoto, K., & Hidaka, K. (2020). Diabetes self-management education and support for adults with newly diagnosed type 2 diabetes mellitus: A systematic review and meta-analysis of randomized controlled trials. *Diabetes Research and Clinical Practice*, 169. <https://doi-org.proxy-hs.researchport.umd.edu/10.1016/j.diabres.2020.108480>
- Tomasone, J., Kauffeldt, K., Chaudhary, R. & Brouwers, M. (2020). Effectiveness of guideline dissemination and implementation strategies on health care professionals' behavior and patient outcomes in the cancer care context: a systematic review. *Implementation Science*, 15(1), 1–18. <https://doi.org/10.1186/s13012-020-0971-6>
- U.S. Department of Health and Human Services. (2019). *Increase the proportion of people with diabetes who get formal diabetes education - D-06*. Healthy People 2030. Retrieved April 24, 2023, from <https://health.gov/healthypeople/objectives-and-data/browse-objectives/diabetes/increase-proportion-people-diabetes-who-get-formal-diabetes-education-d-06>
- Uwizeye, C., Zomahoun, H., Bussi eres, A., Thomas, A., Kairy, D., Massougbojji, J., Rheault, N., Tchoubi, S., Philibert, L., Gaye, L., Khadraoui, L., Charif, A., Diend er e, E., Langlois, L., Dugas, M. & L egar e, F. (2022). Implementation Strategies for Knowledge Products in Primary Health Care: Systematic Review of Systematic Reviews. *Interactive Journal of Medical Research*, 11(2), e38419. <https://doi.org/10.2196/38419>
- Yu, X., Chau, J. P. C., Huo, L., Li, X., Wang, D., Wu, H., & Zhang, Y. (2022). The effects of a nurse-led integrative medicine-based structured education program on self-management behaviors among individuals with newly diagnosed type 2 diabetes: a randomized controlled trial. *BMC Nursing*, 21(1), 1–17. <https://doi-org.proxy->

[hs.researchport.umd.edu/10.1186/s12912-022-00970](https://hs.researchport.umd.edu/10.1186/s12912-022-00970)

Zoubi, F., Menon, A., Mayo, N. & Bussi eres, A. (2018). The effectiveness of interventions designed to increase the uptake of clinical practice guidelines and best practices among musculoskeletal professionals: a systematic review. *BMC Health Services Research*, 18(1), 1–11. <https://doi.org/10.1186/s12913-018-3253-0>



**Table 1**

*Evidence Review Table #1*

<p>Citation #1: Chai, S., Yao, B., Xu, L., Wang, D., Sun, J., Yuan, N., Zhang, X., &amp; Ji, L. (2018). The effect of diabetes self-management education on psychological status and blood glucose in newly diagnosed patients with diabetes type 2. <i>Patient Education and Counseling</i>, 101(8), 1427–1432. <a href="https://doi.org.proxy-hs.researchport.umd.edu/10.1016/j.pec.2018.03.020">https://doi.org.proxy-hs.researchport.umd.edu/10.1016/j.pec.2018.03.020</a>                  Level: IB</p>					
Purpose or Hypothesis	Type of Evidence and Research Design	Sample (population, size, setting)	Intervention Procedures	Primary Outcome/Measures	Results Conclusions
<p>The purpose of the study was to evaluate the impacts of self-management education on psychological outcomes (anxiety and depression) and glycemic control in patients newly diagnosed with type 2 diabetes mellitus.</p>	<p>Randomized controlled study.</p>	<p><b>Sampling technique:</b> Convenience  <b>Eligible participants:</b> newly diagnosed type 2 diabetes, greater than 18 years old, treated with oral hypoglycemic agents with or without insulin.  <b>Setting:</b> Patients recruited from both outpatient and inpatient settings associated with the First Hospital of Dandong, China  <b>Excluded:</b> nursing mothers, pregnant women, patients with hepatorenal diseases or psychotic disorders  <b>Accepted:</b> 118 newly diagnosed patients  <b>Control:</b> n = 55  <b>Intervention:</b> n = 63  <b>Power analysis:</b> not</p>	<p><b>Control protocol:</b> Diabetes education was provided upon routine outpatient visits by providers (5-10min).  <b>Intervention protocol:</b> Patients were divided into different groups based on their characteristics. The groups included an overweight group, a smoking group, and a sedentary group. For all groups, patients received 2-hour diabetes education session by a trained nurse every week for 6 months. The session included a lecture and an interactive component. 2 sessions of lectures (40 min each); two breaks (10 min each); interactive session (20 min). The content of education included diet, exercise, self-monitoring of blood glucose, complication prevention and</p>	<p><b>Dependent variable:</b>                  1. psychological outcomes – anxiety score, depression score                  2. glycemic control  <b>Dependent variable measure:</b>                  The Self-rating Anxiety Scale                  Self-rating Depression Scale                  Glycemic control – FBG, PBG, HbA1C                  The anxiety and depression scale were used to assess the psychological status of the patients at the beginning and end of the study.</p>	<p><b>Statistical results:</b>                  Compared with control group, the anxiety score (36.00 vs. 42.50, <math>P &lt; 0.05</math>) and depression score (35.50 vs. 44.00, <math>P &lt; 0.05</math>) significantly decreased at the sixth month in education group. The fasting blood glucose (6.78 mmol/L vs. 7.70 mmol/L, <math>P &lt; 0.00</math>), postprandial blood glucose (7.90 mmol/L vs. 10.58 mmol/L, <math>P &lt; 0.00</math>) and glycosylated hemoglobin A1C level [6.20 (5.80, 6.60) % vs. 6.70 (6.40, 7.30) %, <math>P &lt; 0.01</math>] significantly decreased after the sixth month in education group compared to the control group.  <b>Conclusions:</b> The</p>

		included. <b>Group homogeneity:</b> No significant differences between groups demonstrated by p values in Table 1	understanding the risk factors of diabetes. <b>Treatment fidelity:</b> All nurses leading the educational sessions were trained. The education courses in the study were delivered under the guidance of Problem Based Learning (PBL). As for the content of education courses, detailed curriculum was created in advance and followed during the education sessions.		psychological status and glycemic control of patients with diabetes receiving self-management education were significantly improved. Anxiety scores and depression scores of patients in the education group showed significant improvement compared to the control group.
<p>Citation #2 Surucu, H. A., Kizilci, S., &amp; Ergor, G. (2017). The Impacts of Diabetes Education on Self Care Agency, Self-Care Activities and HbA1c Levels of Patients with Type 2 Diabetes: A Randomized Controlled Study. <i>International Journal of Caring Sciences</i>, 10(1), 479–489. <a href="https://search-ebshost-com.proxy-hs.researchport.umd.edu/login.aspx?direct=true&amp;db=rzh&amp;AN=123010479&amp;site=eds-live">https://search-ebshost-com.proxy-hs.researchport.umd.edu/login.aspx?direct=true&amp;db=rzh&amp;AN=123010479&amp;site=eds-live</a>                  Level: IA</p>					
Purpose or Hypothesis	Type of Evidence and Research Design	Sample (population, size, setting)	Intervention Procedures	Primary Outcome/Measures	Results Conclusions
<p>This study aimed to evaluate the effects of diabetes education based on the self-care deficit nursing theory (SCDNT) on the self-care agency, diabetes self-care activities, and HbA1c levels of patients with type 2 diabetes mellitus.</p>	<p>Double-blind randomized controlled study</p>	<p><b>Sampling technique:</b> Convenience  <b>Eligible participants:</b> patients with type 2 diabetes diagnosed at least 6 months before, over 18 years of age, residing in the city of Izmir, taking insulin or oral anti-diabetic medicines, without physical disability.  <b>Setting:</b> Diabetes education center at the University Hospital in Izmir, Turkey  <b>Excluded:</b> Mental or</p>	<p><b>Control protocol:</b> The control group received routine clinical care.  <b>Intervention protocol:</b> Diabetes self-management education based on the SCDNT was used as the educative intervention. The education was provided in groups, which included a minimum of 5 and a maximum of 10 people. The education took three weeks. Each week, one session was held, each lasting an average of three hours.</p>	<p><b>Dependent variable:</b>                  1. Self-care agency – defined as “an individual's ability to start or implement health activities to maintain his/her life, health, and well-being.”                  2. Diabetes self-care activities - diet, exercise, blood glucose testing, and foot care                  3. HbA1c  <b>Dependent variable measure:</b></p>	<p><b>Statistical results:</b> In the intervention group, a statistically significant difference was noted in self-care agency (<math>p &lt; .05</math>). There were no significant differences in HbA1c and self-care activities between the two groups. When the pretest and posttest scores were analyzed, the intervention group scores for self-care agency and self-care activity were</p>

		<p>cognitive problem or dependent on another person (due to cerebrovascular disease, immobility, etc.)</p> <p><b>Accepted:</b> 139</p> <p><b>Control:</b> n = 69</p> <p><b>Intervention:</b> n = 70 16 patients withdrew. Seventy-eight patients completed the study.</p> <p><b>Power analysis:</b> Sample size was calculated to be 64 both for intervention and control groups. (With 80% power, a 95% confidence interval, and a margin of error 0.05) – power analysis met.</p> <p><b>Group homogeneity:</b> The analyses demonstrated that there were no significant differences between two groups in terms of characteristics (p&gt;0.05) (Table 1)</p>	<p><b>Treatment fidelity:</b> Diabetic nurse educators led the sessions. Orem’s Self-care Deficit Nursing Theory was used as atheoretical framework and implemented in each session as well as specific steps.</p>	<p>Self-Care Agency Scale – measures self-care agency and ability (reliability coefficient 0.92)</p> <p>Diabetes Self-Care Activities Questionnaire - self-reported measure of the frequency of carrying out diabetes self-care tasks.</p> <p>HbA1c to monitor glycemic control.</p> <p>Prior to study implementation pretest done. In the sixth month after the intervention, the posttest was administered to both groups.</p>	<p>significantly higher, and HbA1c was significantly lower than the scores at pre-intervention (p&lt;0.05). Control group scores showed no difference at the initial and 6th month of the study (p&gt;0.05).</p> <p><b>Conclusion:</b> Self-care agency, self-care activity and the glycemic control of the patients in intervention group improved overall.</p>
<p>Citation #3 Yu, X., Chau, J. P. C., Huo, L., Li, X., Wang, D., Wu, H., &amp; Zhang, Y. (2022). The effects of a nurse-led integrative medicine-based structured education program on self-management behaviors among individuals with newly diagnosed type 2 diabetes: a randomized controlled trial. BMC Nursing, 21(1), 1–17. <a href="https://doi-org.proxy-hs.researchport.umd.edu/10.1186/s12912-022-00970-7">https://doi-org.proxy-hs.researchport.umd.edu/10.1186/s12912-022-00970-7</a> Level: IA</p>					
Purpose or Hypothesis	Type of Evidence and Research Design	Sample (population, size, setting)	Intervention Procedures	Primary Outcome/Measures	Results Conclusions

<p>This study investigated the effects of a nurse-led integrative medicine-based structured education program on self-management behaviors, glycemic control, and self-efficacy among patients newly diagnosed with type 2 diabetes.</p>	<p>Prospective, randomized controlled trial</p>	<p><b>Sampling technique:</b> Convenience</p> <p><b>Eligible participants:</b> 1) live in the community with sufficient ability to commute between to research sites; 2) diagnosed with type 2 diabetes by a physician in the preceding three to nine months 3) older than 18 years; 4) taking medications (including insulin) or not; and 5) consent to participate in the study.</p> <p><b>Setting:</b> four university-affiliated hospitals in Xi'an City, China</p> <p><b>Excluded:</b> patients with a clinical diagnosis of mental disorders; 2) with a terminal illness; 3) physically disabled; 4) taking part in other studies; and 5) with aural or visual problems.</p> <p><b>Accepted:</b> 128 patients</p> <p><b>Control:</b> n = 64; 17/64 lost</p> <p><b>Intervention:</b> n = 64; 12/64 lost</p> <p><b>Power analysis:</b> 64 participants for each group were necessary to detect a between-group difference at a 5% significance level with 80% power (1- <math>\beta</math>),</p> <p><b>Group homogeneity:</b> No</p>	<p><b>Control protocol:</b> routine diabetes care provided by the participating hospitals, including brief discharge instructions focused on medicine regimen, general principles of having foods and taking physical activities.</p> <p><b>Intervention protocol:</b> 4-week program with eight educational sessions delivered by trained nurses following the intervention protocols. Each educational session focused on one of the comprehensive diabetes management topics with the incorporation of traditional Chinese medicine-based lifestyle interventions.</p> <p><b>Treatment fidelity:</b> Maintained using a uniform intervention package (including the study protocol, a set of PowerPoint slides for the program delivery, and the diabetes knowledge and management handbook). There were also audits by the principal investigator and the senior trainer throughout the intervention period.</p>	<p><b>Dependent variable:</b></p> <p>Self-management behaviors – dieting, blood glucose monitoring, foot care, smoking status.</p> <p>Self-efficacy - participants' confidence level in managing diabetes self-care activities regarding blood glucose control, foot care, medication, diet and physical activity.</p> <p>Glycemic control</p> <p><b>Dependent variable measure:</b></p> <p>Self-management behaviors and self-efficacy - measured with the Summary of Diabetes Self-Care Activities and the Diabetes Management Self-Efficacy Scale</p> <p>Glycemic control – HbA1C</p> <p>HbA1c was measured at baseline and 12th-week post-intervention, while other outcomes were measured at baseline, immediate postintervention and 12th-week post-intervention.</p>	<p><b>Statistical results:</b></p> <p>Those in intervention group exhibited significantly better self-management performance in specific diet regarding intake of fruits and vegetables at both follow-ups (<math>\beta=1.02</math>, <math>p=0.011</math> and <math>\beta=0.98</math>, <math>p=0.016</math>, respectively), specific diet regarding intake of high-fat foods at the immediate post-intervention follow-up (<math>\beta=0.83</math>, <math>p=0.023</math>), blood glucose monitoring at the 12th-week follow-up (<math>\beta=0.64</math>, <math>p=0.004</math>), foot care at both follow-ups (<math>\beta=1.80</math>, <math>p&lt;0.001</math> and <math>\beta=2.02</math>, <math>p&lt;0.001</math>, respectively), and medication management at both follow-ups (<math>\beta=0.83</math>, <math>p=0.005</math> and <math>\beta=0.95</math>, <math>p=0.003</math>, respectively). There were significant improvements in Glycated Hemoglobin A (<math>\beta=-0.32\%</math>, <math>p&lt;0.001</math>), and self-efficacy at both follow-ups (<math>\beta=8.73</math>, <math>p&lt;0.001</math> and <math>\beta=9.71</math>, <math>p&lt;0.001</math>, respectively)</p> <p><b>Conclusion:</b> The study demonstrated beneficial effects on multiple diabetes self-</p>
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		significant difference between the groups in social-demographic and clinical characteristics. (Table 2)			management behaviors, glycemic control and self-efficacy.
<p>Citation #4 Tanaka, R., Shibayama, T., Sugimoto, K., &amp; Hidaka, K. (2020). Diabetes self-management education and support for adults with newly diagnosed type 2 diabetes mellitus: A systematic review and meta-analysis of randomized controlled trials. <i>Diabetes Research and Clinical Practice</i>, 169. <a href="https://doi-org.proxy-hs.researchport.umd.edu/10.1016/j.diabres.2020.108480">https://doi-org.proxy-hs.researchport.umd.edu/10.1016/j.diabres.2020.108480</a>                  Level: IA</p>					
Purpose or Hypothesis	Type of Evidence and Research Design	Sample (population, size, setting)	Intervention Procedures	Primary Outcome/Measures	Results Conclusions
<p>This review aimed to evaluate the impacts of diabetes self-management education and support (DSMES) among adults within 12 months of diagnosis of type 2 diabetes mellitus (T2DM) on biomedical, psychosocial, and behavioral outcomes compared with the standard care.</p>	<p>Systematic review and meta-analysis</p>	<p><b>Eligible studies:</b> Participants included were aged 18 years or older, diagnosed with T2DM within the previous 12 months, individual and cluster RCTs, delivered the DSMES intervention within 12 months of the person being diagnosed with T2DM.</p> <p><b>Setting:</b> more than half of the reviewed populations were from developed Western countries.</p> <p><b>Excluded:</b> Studies with participants younger than 18 years or had other types of diabetes, prediabetes, or gestational diabetes were excluded. Quasi-RCTs were also excluded.</p> <p><b>Accepted:</b> 12 studies included 5 included in meta-analysis</p>	<p>Five electronic databases (the Cochrane Library, MEDLINE, PsycINFO, CINAHL, and ERIC) were searched. The researchers also searched for other sources through ClinicalTrials.gov and the World Health Organization International Clinical Trials Registry Platform. Two authors independently screened titles and abstracts of relevant articles, followed by a full-text assessment. Eligible studies were identified through discussion, and conflicts were resolved by a third reviewer.</p>	<p>Biomedical outcomes – HbA1C, body weight, waist circumference</p> <p>Psychosocial outcomes – QoL, General diabetes knowledge, illness perception, depression</p> <p>Behavioral outcomes – self-care, physical activities, diet</p>	<p><b>Statistical results:</b> Effect size was estimated by mean difference with 95% confidence interval. Pooled data from two studies showed mean differences in HbA1c -0.21% (95% CI, -0.38, -0.04), body weight -2.36 kg (-5.77, 1.05), and waist circumference -1.8 cm (-5.63, 2.04) at 12 months after the interventions. The QoL result in the meta-analysis was inconclusive. The pooled effect of QoL scores was 0.55 (-9.63, 10.74). No data in the behavioral outcomes were synthesized statistically because of differences in the measurement</p>

		<p><b>Group homogeneity:</b> 12 RCTs, A total of 2,386 individuals with newly diagnosed T2DM were included with study sample sizes ranging from 42 to 824. The baseline mean HbA1c ranged from 6.7% to 8.6% and the baseline body mass index (BMI) ranged from 25.7 kg/m<sup>2</sup> to 32.5 kg/m<sup>2</sup>. Biomedical outcomes were reported in 10 studies, psychosocial outcomes in nine, and behavioral outcomes in eight. Five studies covered all outcomes. (Table 1).</p>			<p>methods.</p> <p><b>Conclusion:</b> DSMES in adults within 12 months of the initial T2DM diagnosis could affect biomedical outcomes. The pooled effect of DSMES on glycemic control was significant.</p>
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Citation #5 Parmar, V., Patel, S., & Iyer, C. (2018). Effect of counseling on newly diagnosed Type 2 diabetes mellitus patients visiting a tertiary care hospital: A randomized control trial. Indian Journal of Community Medicine, 43(3), 244–245. [https://doi.org/10.4103/ijcm.IJCM\\_61\\_18](https://doi.org/10.4103/ijcm.IJCM_61_18)  
 Level: IB

Purpose or Hypothesis	Type of Evidence and Research Design	Sample (population, size, setting)	Intervention Procedures	Primary Outcome/Measures	Results Conclusions
<p>The study evaluated the role of counseling on the knowledge, attitude, and practice (KAP) in newly diagnosed type 2 diabetes mellitus patients from a tertiary hospital.</p>	<p>Randomized clinical trial</p>	<p><b>Sampling technique:</b> Convenience</p> <p><b>Eligible participants:</b> Newly diagnosed patients ages 25 to 65 years</p> <p><b>Setting:</b> tertiary hospital (medical outpatient department) in Gujarat, India</p> <p><b>Excluded:</b> Patients with diagnosis duration &lt;1 month or &gt;4 months, physical</p>	<p><b>Control protocol:</b> no counseling provided.</p> <p><b>Intervention protocol:</b> given counseling on various aspects of diabetes including its complications, medications, diet, lifestyle modifications, exercise, danger signs and symptoms of hypoglycemia. Patients were first introduced to a video of about 15 min that contained the</p>	<p><b>Dependent variable:</b> Knowledge, attitude, and practice</p> <p><b>Dependent variable measure:</b> KAP questionnaire – tested at the end of the follow-up period at 4 months</p>	<p><b>Statistical results:</b> Postintervention mean KAP score of the intervention group was 29 ± 4.65. Results of paired t-test applied on pre- and post-intervention data gave statistically significant difference (P &lt; 0.0001). Statistically significant difference between intervention and</p>

		deformities, other comorbidities, pregnant females  <b>Accepted:</b> 96 newly diagnosed patients with DM2 in age group 25-65 years  <b>Control:</b> n = 48; 8 lost in follow up  <b>Intervention:</b> n = 48; 8 lost in follow up  <b>Power analysis:</b> not included.	above-mentioned information, and then, the patient was counseled for 7–15 min. At the end of the first session, leaflets on diabetes were provided to the patients.		control group (P < 0.0001).  <b>Conclusion:</b> Counseling led to a better increase in KAP in patients. In the study, single time counseling led to improvement in the intervention group
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Citation #6 Olesen, K., Folmann Hempler, N., Drejer, S., Valeur Baumgarten, S., & Stenov, V. (2020). Impact of patient-centered diabetes self-management education targeting people with type 2 diabetes: an integrative review. *Diabetic Medicine*, 37(6), 909–923. <https://doi-org.proxy-hs.researchport.umd.edu/10.1111/dme.14284> Level: IIIA

Purpose or Hypothesis	Type of Evidence and Research Design	Sample (population, size, setting)	Intervention Procedures	Primary Outcome/Measures	Results Conclusions
The purpose of the review was to determine the impact of person-centered diabetes self-management education on patients with type 2 diabetes on behavioral, psychosocial and cardiometabolic outcomes.	Systematic review of a combination of RCTs, quasi-experimental and nonexperimental studies, without meta-analysis	<b>Eligible studies:</b> Published in English between January 2008 and June 1, 2019; peer reviewed; studied people diagnosed with type 2 diabetes; examined the impact of person-centeredness on diabetes self-management education and support; and documented individual outcomes.  <b>Setting:</b> Most studies were conducted in Western countries (Europe, North	Study selection was based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. A search on PubMed, Scopus and CINAHL databases was conducted to identify relevant articles. The following search terms were used: user, person, patient, client, engagement, participation, centeredness, centeredness, centered, collaboration and active	Psychosocial and cognitive outcomes – QoL, depression -Diabetes Quality of Life (DQOL) -PHQ-9 - Diabetes Empowerment Scale Health behavior outcomes – healthy eating, physical activity, smoking behaviors	<b>Statistical results:</b> Ten of 16 studies of the review assessed for HbA1c and reported significant improvement in the intervention group. Quality of life was assessed in several studies. Only two studies did report improvements in quality of life.  <b>Conclusion:</b> Studies were successful in

		<p>America, or Australia); however, six studies from Southeast Asia, and a single study from Iran.</p> <p><b>Excluded:</b> Studies with insufficient sample size; high loss to follow-up; and insufficient randomization or adjustment for covariates</p> <p>The study included 22 papers in the final review.</p> <p><b>Group homogeneity:</b> Two studies used qualitative methods, one study used mixed methods, 13 studies were randomized controlled trials (RCTs) with up to four arms, and the remaining six studies were cohort studies</p>	<p>involvement. At least two authors assessed each title and abstract for eligibility based on the inclusion criteria. Included papers then underwent full-text review and were excluded if they failed to meet the inclusion criteria.</p>	<p>- Summary of Diabetes Self-Care Activities</p> <p>HbA1c</p>	<p>improving psychosocial outcomes and glycemic control, but less successful in improving lifestyle behaviors such as diet and exercise and related outcomes of weight, waist circumference and LDL cholesterol.</p>
<p>Citation #7 Singh, F. H. D., Islam, F., Shaikh, A., Pathak, R., Kohli, S., &amp; Kashyap, V. (2022). A Randomized controlled trial to assess the effectiveness of group-based Diabetes Self- Management Education (DSME) program on glycemic control and self-care activities among type-2 diabetics in South-East Delhi. <i>Indian Journal of Community Health</i>, 34(3), 402–407. <a href="https://doi-org.proxy-hs.researchport.umd.edu/10.47203/IJCH.2022.v34i03.015">https://doi-org.proxy-hs.researchport.umd.edu/10.47203/IJCH.2022.v34i03.015</a></p> <p>Level: IA</p>					
Purpose or Hypothesis	Type of Evidence and Research Design	Sample (population, size, setting)	Intervention Procedures	Primary Outcome/Measures	Results Conclusions



<p>The purpose of this research article is to assess the effect of group-based diabetes self-management education on glycemic control and self-care activities as compared to routine care</p>	<p>Non-blinded parallel arm randomized controlled clinical trial</p>	<p><b>Sampling technique:</b> Convenience</p> <p><b>Eligible participants:</b> uncomplicated type-2 Diabetes Mellitus (DM), diagnosed at least six months before the start of the study, willing to provide informed consent, participate in activities, no plans to move out of the area within the 12-month study period and had access to a mobile phone.</p> <p><b>Setting:</b> Hamdard Institute of Medical Sciences and Research (HIMSR), New Delhi.</p> <p><b>Excluded:</b> Individuals diagnosed with other types of diabetes, diabetes-related complications, anemic, glucocorticoid therapy for at least 3 months, on any weight loss program, pregnant women</p> <p><b>Accepted:</b> 169 patients</p> <p><b>Control:</b> n = 84; 41% lost</p> <p><b>Intervention:</b> n = 85; 21% lost</p> <p><b>Power analysis:</b> The sample size for each group was estimated to be 68. Considering a drop-out rate of 20%, the total sample size was calculated to be 85 in</p>	<p><b>Control protocol:</b> Received the usual care which entailed a 20–30 min standard doctors’ visit where the recent HbA1c level and medication compliance were reviewed, and a brief informal patient-tailored diabetes education was offered.</p> <p><b>Intervention protocol:</b> The intervention group received DSME along with the usual care. The DSME intervention had 6 sessions of 30 minutes each, delivered once a month by a single educator in a group of 6-7 members. Each session had a guided discussion to emphasize key messages towards diabetes management, self-care activities and prevention of long-term effects of diabetes.</p> <p><b>Treatment fidelity:</b> Education materials were used to guide discussion. Trained educator led all sessions.</p>	<p><b>Glycemic control – A1C</b></p> <p><b>Self-care activities</b> – the frequency with which a patient followed a diabetes routine including diet, exercise, blood-glucose testing, foot care, and smoking status.</p> <p>- The Summary of Diabetes Self-Care Activities Scale (SDSCA)</p> <p>“Endline assessment was done after a period of 6-months in both the intervention and control arms.”</p>	<p><b>Statistical results:</b> For glycemic control, improvements were greater in the intervention arms as compared to the control arm (p=0.002). For self-care, the results showed significant difference between the intervention and control group: general diet (p=0.011), specific diet (p=0.006), exercise (p=0.014), blood sugar testing (p=0.04), foot care, and carbohydrate spacing (p&lt;0.001).</p> <p><b>Conclusion:</b> The study demonstrated group-based DSME increasing self-care practices among diabetics, and result in better glycemic control.</p>
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		<p>each arm.</p> <p><b>Group homogeneity:</b> The mean age of the study participants was <math>50.0 \pm 9.9</math> years, with a higher proportion of female participants (62.1%) as compared to males (37.9%). No sign differences. (Table 1).</p>			
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**Table 2**

*Evidence Review Table #2*

Citation #1: Shanbhag, D., Graham, I. D., Harlos, K., Haynes, R. B., Gabizon, I., Connolly, S. J., & Van Spall, H. G. C. (2018). Effectiveness of implementation interventions in improving physician adherence to guideline recommendations in heart failure: a systematic review. *BMJ Open*, 8(3), e017765. <https://doi.org/10.1136/bmjopen-2017-017765>

Level: 1B

Purpose or Hypothesis	Type of Evidence and Research Design	Sample (population, size, setting)	Intervention Procedures	Primary Outcome/Measures	Results Conclusions
<p>The primary objective of the review was to examine the effectiveness of implementation interventions in increasing physician adherence to the specified HF guideline recommendations.</p>	<p>Systematic review</p>	<p><b>Eligible studies:</b> included trials evaluating one or more interventions aimed at improving physician adherence to class I HF guidelines, relative to usual care.</p> <p>included randomized controlled trials (RCT), cohort studies (with comparisons), controlled and uncontrolled before and after studies, and interrupted time series studies</p> <p><b>Excluded:</b> excluded articles that were abstracts, protocols, letters, did not test implementation interventions, did not focus on patients with HF, no comparator group, no</p>	<p>writers searched for all English language articles published since 1990 in MEDLINE, EMBASE, HEALTHSTAR, CINAHL, The Cochrane Library, The Campbell Collaboration, The Joanna Briggs Institute Evidence-based Practice Database, The Agency for Healthcare Research and Quality Evidence-based Practice Centers' Research Reports, and the University of York Centre for Reviews and Dissemination Database. The primary search strategy used the following terms: heart failure, guideline adherence, practice guideline, evidence-based medicine, implement (online supplementary appendix 1). Their secondary search</p>	<p>The primary outcomes included the proportion of eligible patients with HF who: were prescribed a guideline-recommended pharmacological treatment such as <math>\beta</math>-blockers, ACE inhibitors (ACEI), angiotensin II receptor blockers (ARB) or mineralocorticoid receptor antagonists (MRA); were referred for implantable cardioverter defibrillator (ICD) and/or cardiac resynchronization therapy (CRT) consideration; were provided self-care education at discharge; and/or had their left ventricular ejection fraction (LVEF) quantified. Secondary outcomes were clinical</p>	<p><b>Results:</b> Provider-level interventions (n=13 studies) included audit and feedback, reminders and education. Organization-level interventions (n=18) included medical records system changes, multidisciplinary teams, clinical pathways and continuity of care. System-level interventions (n=3) included provider/ institutional incentives. Four studies assessed multi-level interventions. Clinical pathways, multidisciplinary teams</p>

		<p>outcomes of interests</p> <p><b>Accepted:</b> 38 articles</p>	<p>included terms for each of the different EPOC intervention types and heart failure (online supplementary appendix 2). Two authors independently screened titles and abstracts, and then assessed select full-text articles according to the eligibility criteria</p>	<p>outcomes such as HF-related hospitalizations, readmissions and mortality</p>	<p>and multifaceted interventions were most consistently successful in increasing physician uptake of guidelines. . Baseline assessment of barriers, staff training, iterative intervention development, leadership commitment and policy/financial incentives were associated with intervention effectiveness</p>
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Citation #2: Zoubi, F., Menon, A., Mayo, N. & Bussi eres, A. (2018). The effectiveness of interventions designed to increase the uptake of clinical practice guidelines and best practices among musculoskeletal professionals: a systematic review. BMC Health Services Research, 18(1), 1–11. <https://doi.org/10.1186/s12913-018-3253-0>

Level: 1B

<b>Purpose or Hypothesis</b>	<b>Type of Evidence and Research Design</b>	<b>Sample (population, size, setting)</b>	<b>Intervention Procedures</b>	<b>Primary Outcome/Measures</b>	<b>Results Conclusions</b>
<p>The goal of this review was to summarize and evaluate evidence about the effectiveness of knowledge translation interventions to improve the uptake and application of clinical practice guidelines and best practices for MSK</p>	<p>Systematic review</p>	<p><b>Eligible studies:</b> Only randomized controlled trials (RCTs) were included in this review</p> <p><b>Excluded:</b> Non-RCTs, uncontrolled studies, and observational studies were excluded. Protocols, commentaries, conference proceedings, and reviews were also excluded.</p> <p><b>Accepted:</b> 13 articles</p>	<p>The following electronic databases were searched from inception to August 10th, 2016: MEDLINE (Ovid interface), EMBASE, CINAHL, and CENTRAL (Cochrane library). The search strategy was built using four key terms, MSK disorders, MSK health care professionals, KT interventions, and a filter for</p>	<p>change in practice or behavior, knowledge, skills, self-efficacy) or patient level (such as change in knowledge, health status, pain, disability)</p>	<p><b>Results:</b> Interactive educational meetings were found to have a small effect on enhancing professional adherence to clinical practice guidelines for hip and knee OA for physiotherapists, as compared to those who received no intervention (d = 0.23 (0.01–0.45), P &lt; 0.05) [50] or a conventional educational meeting (d = 0.28 (0.02–0.53), P &lt; 0.05) [49] at 3-month follow-up. Distribution of</p>

<p>disorders among MSK professionals</p>			<p>RCTs. The search strategy was developed in MEDLINE and translated into the other databases using the appropriate MESH terms as applicable. A validated search strategy with a filter for KT interventions [34] was used with some modifications (e.g. removing keywords such as nurse, pharmacist, and general practitioner) to fit our review question.</p>		<p>educational materials (LBP management guideline by postal mail) against no intervention also had a small effect on changing practice behavior. study showed that communication skills training from educational meetings and reminders for physiotherapists to support patients' psychological needs were found to be more effective than the control for managing chronic LBP at 16.7 ± 6.9 weeks (d = 2.27 (1.24–3.29), P &lt; 0.05) [56]. A second study reported on the effect of educational meetings on enhancing the appropriate use of diagnostic imaging for spinal disorders for chiropractors [47]. While the subgroup with access to a reminder at midpoint performed significantly better than another subgroup (F = 4.486; df = 1, 30; P = 0.043), the overall scores for the pretest and the final test did not significantly differ at 10 weeks</p> <p>Together, these findings suggest that for professional outcomes, single-component KT interventions are more effective than no intervention, and multifaceted interventions are more effective than single-component interventions.</p>
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Citation #3: Tomasone, J., Kauffeldt, K., Chaudhary, R. & Brouwers, M. (2020). Effectiveness of guideline dissemination and implementation strategies on health care professionals' behaviour and patient outcomes in the cancer care context: a systematic review. *Implementation Science*, 15(1), 1–18.  
<https://doi.org/10.1186/s13012-020-0971-6>

Level: 1B

Purpose or Hypothesis	Type of Evidence and Research Design	Sample (population, size, setting)	Intervention Procedures	Primary Outcome/Measures	Results Conclusions
<p>The aim of this review was to determine the effectiveness of CPG dissemination and implementation strategies among HCPs in the cancer care context.</p>	<p>Systematic review</p>	<p><b>Eligible studies:</b> Inclusion criteria for this review were that studies had to (a) be published in a peer-reviewed journal; (b) use an experimental (randomized controlled trial (RCT), controlled clinical trial), or quasi-experimental study design (interrupted time series, controlled before-and-after design); and (c) examine the dissemination and/or implementation of CPGs among medical and/or allied HCPs within the cancer care context</p> <p><b>Excluded:</b> Exclusion criteria included (a) cross-sectional, cohort, case, and retrospective study designs; (b) unpublished data, abstracts, conference</p>	<p>Five electronic databases (MEDLINE, EMBASE, PsychINFO, CINAHL, and the Cochrane Controlled Trials Register) were systematically searched using a search strategy developed from previous systematic reviews examining CPG dissemination and/or implementation strategies in medical and/or allied health care contexts [6, 7], and the Cochrane Effective Practice and Organization of Care (EPOC) Group's strategy [8]. The search combined search terms relevant to CPG dissemination and implementation, medical and allied HCPs, outcomes, trial</p>	<p>The outcome of interest was an objective or subjective (i.e. self-reported) measure of HCP behaviour (i.e. service delivery [5];) in relation to CPG recommendations, such as screening rates, prescription, or referrals. Antecedents to behaviour—such as knowledge, attitudes, or perception of barriers towards a CPG—were also considered as primary outcomes. Secondary outcomes (i.e. outcomes that stem from a change in service delivery/HCP behaviour) included patient outcomes such as survival, quality of life measures, test completion, and pain.ejection fraction</p>	<p><b>Results:</b> Educational strategies (n = 24), feedback on guideline compliance (n = 11), and providing reminders (n = 10) were the most utilized strategies. When used independently, providing reminders and feedback on CPG compliance corresponded with positive significant changes in outcomes. Further, when used as part of multi-strategy interventions, group education and organizational strategies (e.g. creation of an implementation team) corresponded with positive significant changes in outcomes</p>

		<p>proceedings, and qualitative only studies; (c) studies exclusively targeting the dissemination and/or implementation of CPGs among patients, the general public, and hospital administrators; and (d) studies that were not designed to enhance the dissemination and/or implementation of a CPG (i.e. clinical interventions, such as those testing a new treatment modality that aim to establish clinical effectiveness)</p> <p><b>Accepted:</b> 33 articles</p>	<p>design, and cancer care. The search strategy was peer reviewed by a health sciences librarian external to the research team, with expertise in systematic review search</p>	<p>(LVEF) quantified. Secondary outcomes were clinical outcomes such as HF-related hospitalizations, readmissions and mortality</p>	
<p>Citation #4: Bora, A., Piechotta, V., Kreuzberger, N., Monsef, I., Wender, A., Follmann, M., Nothacker, M. &amp; Skoetz, N. (2023). The effectiveness of clinical guideline implementation strategies in oncology—a systematic review. BMC Health Services Research, 23(1), 1–15. <a href="https://doi.org/10.1186/s12913-023-09189-x">https://doi.org/10.1186/s12913-023-09189-x</a></p> <p>Level: 1B</p>					
<p><b>Purpose or Hypothesis</b></p>	<p><b>Type of Evidence and Research Design</b></p>	<p><b>Sample (population, size, setting)</b></p>	<p><b>Intervention Procedures</b></p>	<p><b>Primary Outcome/Measures</b></p>	<p><b>Results Conclusions</b></p>
<p>This systematic review aims to fill the gap regarding the synthesis of the effectiveness of</p>	<p>Systematic review</p>	<p><b>Eligible studies:</b> Only prospectively registered controlled studies (e.g. (cluster) randomized</p>	<p>The following electronic databases were searched on 16 December 2022: PubMed, Web of</p>	<p>Primary (patient-level): Overall survival, Quality of Life, Adverse</p>	<p><b>Results:</b> Educational meetings combined with materials, opinion leaders, audit and feedback, a tailored intervention or academic</p>

<p>recent guideline implementation strategies on patient-relevant outcomes and guideline adherence of healthcare professionals in the oncological settings</p>		<p>controlled trials, controlled pre-post trial designs) were included <b>Excluded:</b> <b>Accepted:</b> 9 articles</p>	<p>Science, GIN, CENTRAL and CINAHL. With the assistance of an experienced information specialist (IM), these search strategies were optimized. Search filters were used to identify papers with study designs of interest (e.g. filter for RCTs). The search strategies included keywords such as clinical practice guideline, implementation, survival, adherence, behaviour, health professionals, patients, oncology.</p>	<p>event(s) Secondary (provider-level): Guideline adherence outcomes</p>	<p>detailing may have little to no effect on overall survival, quality of life and adverse events of cancer patients compared to no intervention, however, the evidence is either uncertain or very uncertain. Multi-component interventions may increase or slightly increase guideline adherence regarding screening, referral and prescribing behaviour of healthcare professionals according to guidelines, but the certainty in evidence is low Multi-component interventions may increase or slightly increase guideline adherence regarding screening, referral and prescribing behaviour of healthcare professionals according to guidelines, but the certainty in evidence is low</p>
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Citation #5: Uwizeye, C., Zomahoun, H., Bussi eres, A., Thomas, A., Kairy, D., Massougbodji, J., Rheault, N., Tchoubi, S., Philibert, L., Gaye, L., Khadraoui, L., Charif, A., Diend er e, E., Langlois, L., Dugas, M. & L egar e, F. (2022). Implementation Strategies for Knowledge Products in Primary Health Care: Systematic Review of Systematic Reviews. Interactive Journal of Medical Research, 11(2), e38419. <https://doi.org/10.2196/38419>

Level: 1B

<p><b>Purpose or Hypothesis</b></p>	<p><b>Type of Evidence and Research Design</b></p>	<p><b>Sample (population, size, setting)</b></p>	<p><b>Intervention Procedures</b></p>	<p><b>Primary Outcome/Measures</b></p>	<p><b>Results Conclusions</b></p>
<p>This study aimed to characterize which</p>	<p>Systematic review</p>	<p><b>Eligible studies:</b> systematic</p>	<p>searched MEDLINE (Ovid), EMBASE, CINAHL</p>	<p>focused on implementation</p>	<p><b>Results:</b> Educational strategies</p>



<p>knowledge products are frequently implemented, the implementation strategies used in primary care, and the implementation outcomes that are measured.</p>		<p>reviews - Cochrane and non-Cochrane SRs (with or without meta-analyses) and mixed method reviews that used a comprehensive and reproducible approach; include the following implementation strategies: audit, feedback, audit and feedback, clinical incident reporting, monitoring the performance of the delivery of health care, communities of practice, continuous quality improvement, educational games, educational materials, educational meetings, educational outreach visits or academic detailing, clinical practice guidelines, interprofessional education, local consensus processes, local opinion leaders, managerial supervision, patient-mediated interventions, public release of performance data, reminders, routine patient-reported outcome measures, and tailored interventions.</p> <p><b>Excluded:</b> excluded interventions that were used to develop the knowledge product and the scaling up and sustainability of interventions (studies that were housed under a separate project).</p>	<p>(EBSCO), Ovid PsycINFO (Ovid), Web of Science (Web of Science), and Cochrane Library (Cochrane Library) databases from their inception to October 18, 2019, without restrictions on language or geographic settings. We searched the bibliographies of the included reviews to identify additional relevant ones.</p> <p>We followed an extensive literature search process to identify SRs of interventions that implement health knowledge products. In March 2017, an information specialist (NR) designed the search strategy for each database. The initial search strategy developed in MEDLINE was reviewed and approved by some of the team members before its translation into other bibliographic databases by the information specialist. During the selection process, gaps were identified in the search strategy. The search strategy was modified and rerun in October 2019. We used the following main concepts: KT, strategies, reviews, health professionals, and primary care.</p>	<p>outcomes, including acceptability, adoption, appropriateness, feasibility, adherence or fidelity, implementation costs</p>	<p>were the most frequently used, mainly educational meetings in 74% (60/81) of SRs, educational materials distribution in 73% (59/81) of SRs, and educational outreach in 56% (45/81) of SRs. Other frequent strategies used were reminders in 65% (53/81) of SRs. Implementation strategies commonly combine education-based strategies (material distributions, meetings, and outreach), reminders, audits and feedback.</p>
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		<b>Accepted:</b> 81 SR			
<p>Citation #6: Liu, X.-L., Wang, T., Tan, J.-Y., Stewart, S., Chan, R. J., Eliseeva, S., Polotan, M. J., &amp; Zhao, I. (2022). Sustainability of healthcare professionals' adherence to clinical practice guidelines in primary care. <i>BMC Primary Care</i>, 23(1), 1–17. <a href="https://doi-org.proxy-hs.researchport.umd.edu/10.1186/s12875-022-01641-x">https://doi-org.proxy-hs.researchport.umd.edu/10.1186/s12875-022-01641-x</a></p> <p>Level: 1B</p>					
<b>Purpose or Hypothesis</b>	<b>Type of Evidence and Research Design</b>	<b>Sample (population, size, setting)</b>	<b>Intervention Procedures</b>	<b>Primary Outcome/Measures</b>	<b>Results Conclusions</b>
<p>The aim of this literature analysis was to explore the sustainability of healthcare professionals' adherence to CPGs after receiving planned guideline implementation strategies, activities, or programmes in primary care.</p>	<p>Systematic review</p>	<p><b>Eligible studies:</b> Types of studies: Randomized controlled trials (RCTs), non-randomized studies, and before-after controlled studies.</p> <p>Types of participants: Healthcare professionals working in primary care settings, including general practitioners (GPs), practice nurses, allied health providers, therapists (e.g., physiotherapists, occupational therapists, music therapists, and speech and language therapists), dietitians, paramedics, and community healthcare workers. Primary care was defined as “the provision of integrated, accessible health care services by clinicians who are accountable for</p>	<p>An electronic database search was performed in nine databases to locate eligible publications from January 2000 through May 2021, and the search was limited to the English language only. The research team developed tailored search strategies in consultation with a university librarian. The databases were: Cochrane Central Register of Controlled Trials (CENTRAL); Cumulative Index to Nursing and Allied Health Literature (CINAHL); EMBase; Joanna Briggs Institute; Journals@Ovid; Medline; PsycINFO; PubMed, and Web of Science. The following registers for</p>	<p>outcomes related to the implementation process (e.g., increased rates in continued use of the evidence-based innovations)</p>	<p><b>Results:</b> Educational outreach visits, teaching sessions, reminders, audit and feedback, and printed materials were utilized in the included studies as guideline implementation strategies. None of the included studies utilized purpose-designed measurements to evaluate the extent of sustainability. Three studies showed positive sustainability results, three studies showed mixed sustainability results, and four studies reported no significant changes in the sustainability of adherence to CPGs. Overall, it was difficult to quantify the extent to which CPG-based healthcare behaviours were fully sustained based on the variety of results reported in the included studies.</p>

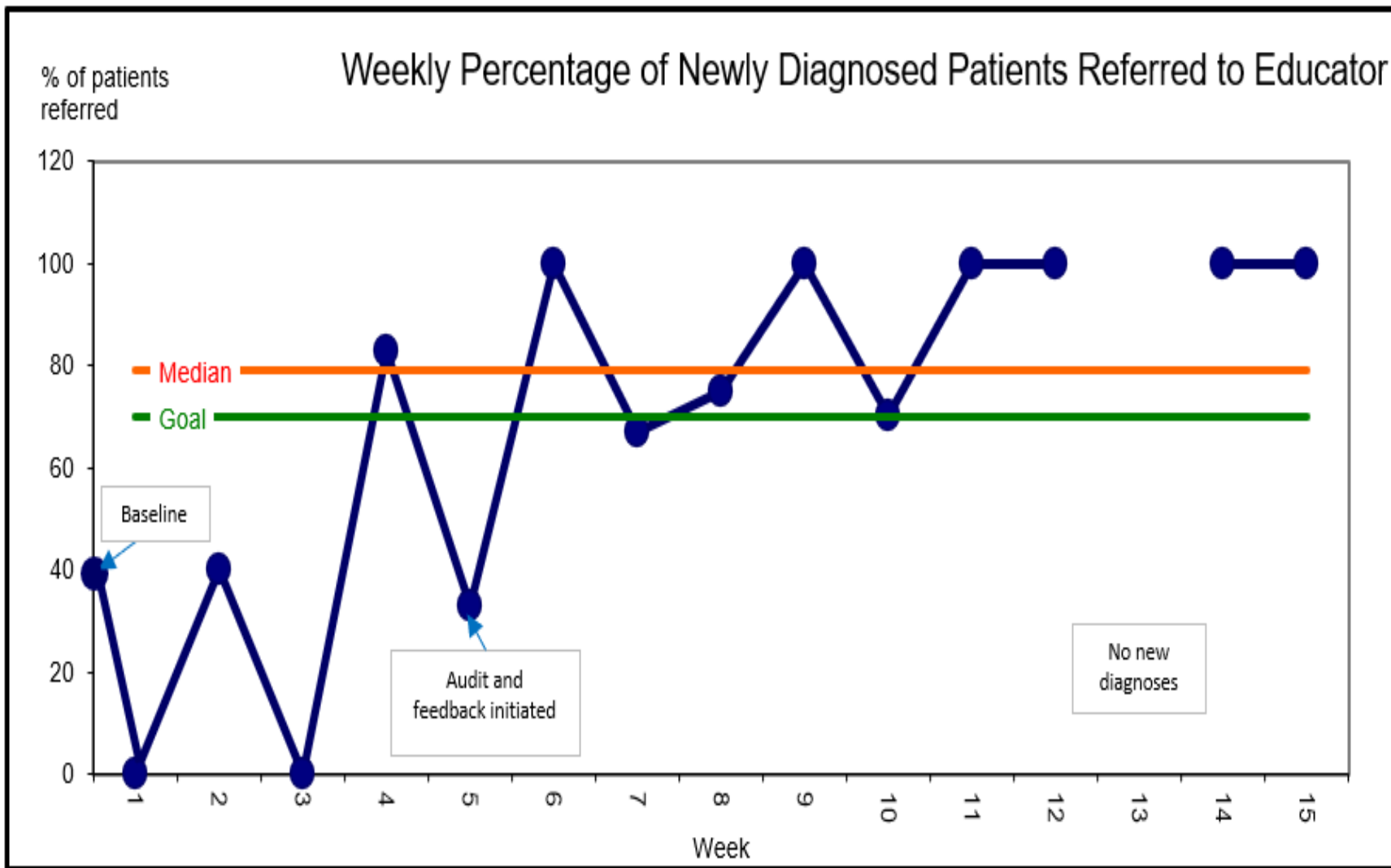
		<p>addressing a large majority of personal health care needs, developing a sustained partnership with patients, and practicing in the context of family and community” (p. 192) [25].</p> <p>Types of interventions: Any planned strategies, activities, or programmes (e.g., professional, organizational, and financial programmes) as part of a guideline implementation project that facilitated the sustainability of healthcare professionals’ adherence to CPGs in primary care. The sustainability of healthcare professionals’ adherence to CPGs was one of the study outcomes.</p> <p>Types of comparators for controls: Usual conventional practice in primary care or only passively received guidelines without any planned guideline implementation strategies, activities, or programmes.</p> <p>Types of outcome measures: Any objective and subjective measure of the sustainability of healthcare professionals’ adherence to CPGs (e.g., how long a CPG was sustained, follow-up sustainability assessment,</p>	<p>ongoing or completed trials were also searched: ClinicalTrials.gov (<a href="https://clinicaltrials.gov/">https://clinicaltrials.gov/</a>) and the Australian New Zealand Clinical Trials Registry (<a href="http://www.anzctr.org.au/">http://www.anzctr.org.au/</a>). Moreover, the National Guideline Clearinghouse (NGC), the National Institute for Health and Care Excellence (NICE) and Turning Research Into Practice (TRIP) were also searched as secondary resources</p>		<p>Current guideline implementation strategies may potentially improve the sustainability of PCPs’ adherence to CPGs. However, the literature reveals a limited body of evidence for any given guideline implementation strategy.</p>
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		and self-reported performance in the sustainability period) were included.  <b>Excluded:</b> if did not meet the inclusion criteria  <b>Accepted:</b> 48 articles			
<p>Citation #7: Pedersen, E., Rubenstein, L., Kandrack, R., Danz, M., Belsher, B., Motala, A., Booth, M., Larkin, J. &amp; Hempel, S. (2018). Elusive search for effective provider interventions: a systematic review of provider interventions to increase adherence to evidence-based treatment for depression. <i>Implementation Science</i>, 13(1), 1–30. <a href="https://doi-org.proxy-hs.researchport.umd.edu/10.1186/s13012-018-0788-8">https://doi-org.proxy-hs.researchport.umd.edu/10.1186/s13012-018-0788-8</a></p> <p>Level: 1A</p>					
Purpose or Hypothesis	Type of Evidence and Research Design	Sample (population, size, setting)	Intervention Procedures	Primary Outcome/Measures	Results Conclusions
<p>In this systematic review, we synthesize estimates of the effects of provider interventions, with a specific focus on behavioral health provider change, to promote adherence to evidence-based treatments for depression.</p>	<p>Systematic review</p>	<p><b>Eligible studies:</b> Eligible participants were healthcare providers responsible for patient care in the outpatient setting (e.g., primary care physicians, psychiatrists, mental health professionals, nurse practitioners, other general practitioners such as physician assistants). Eligible interventions aimed to increase adherence to depression guidelines and</p>	<p>excluded system redesign efforts as interventions for our purposes (e.g., collaborative care where infrastructures are re-organized</p>	<p>Outcomes documented the adherence of providers to guidelines or to guideline-concordant practices</p>	<p><b>Results:</b> Studies evaluated diverse provider interventions, including distributing guidelines to providers, education/training such as academic detailing, and combinations of education with other components such as targeting implementation barriers. Results were heterogeneous and analyses comparing provider interventions with usual clinical practice did not indicate a statistically significant difference in</p>

		<p>guideline-concordant practice (e.g., continuing education, quality improvement projects, and financial, organizational, or regulatory interventions that used knowledge translation strategies).</p> <p>RCT study design, with studies randomizing provider participants or practice sites to interventions.</p> <p><b>Excluded:</b></p> <p><b>Accepted:</b> 22 articles</p>			<p>guideline adherence across studies. There was some evidence that provider interventions improved individual outcomes such as medication prescribing and indirect comparisons indicated more complex provider interventions may be associated with more favorable outcomes. Provider interventions improved the outcomes of medication prescribing and patient depression treatment response. Results also suggested that some interventions that were tailored to providers' needs and that went beyond simply distributing guidelines to providers may improve provider behavior and promote guideline adherence.</p>
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Figure 1

Run Chart – Referrals to the DM Educator



**Figure 2**

*Fishbone*

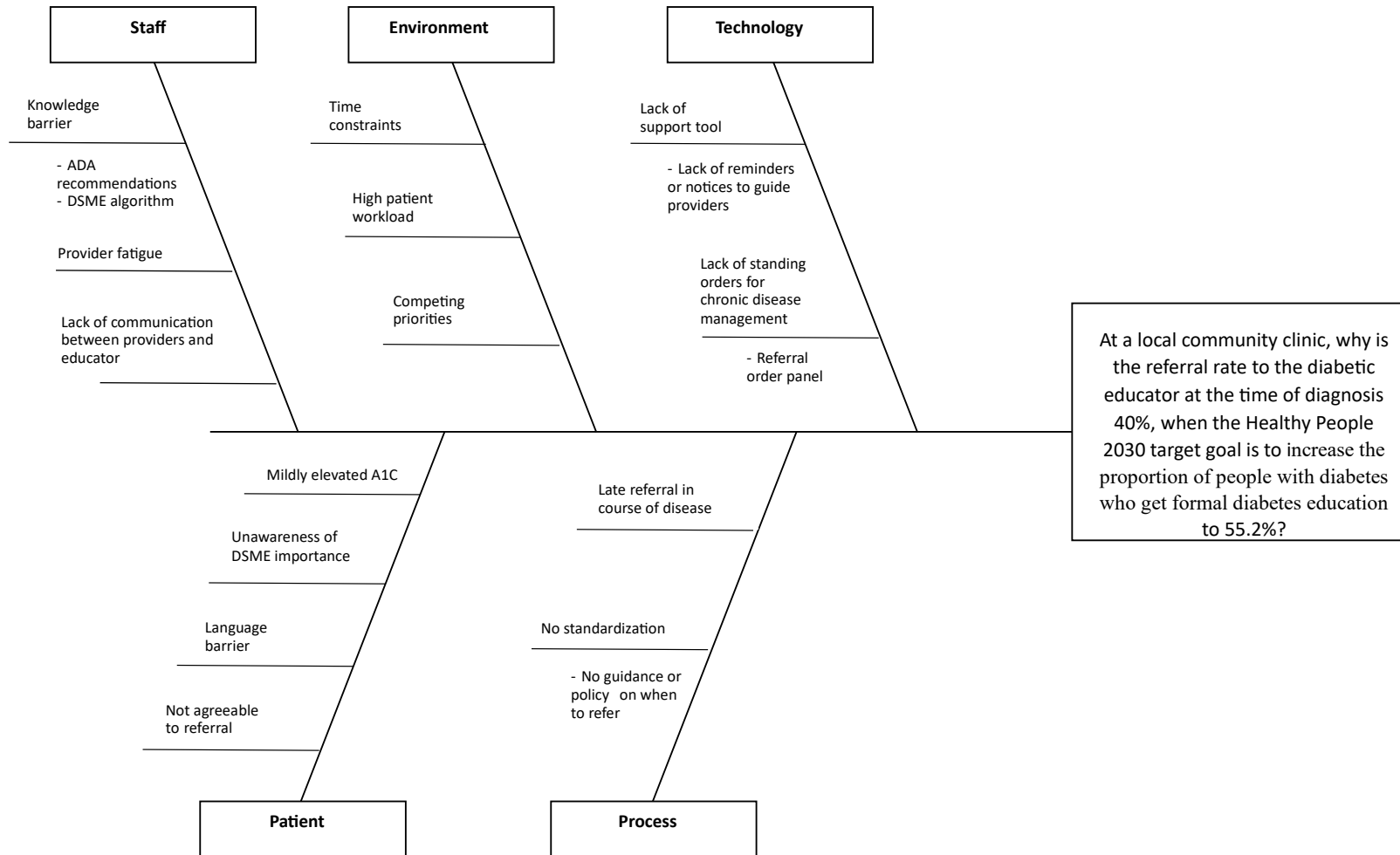


Figure 2

*PARiHS Framework*

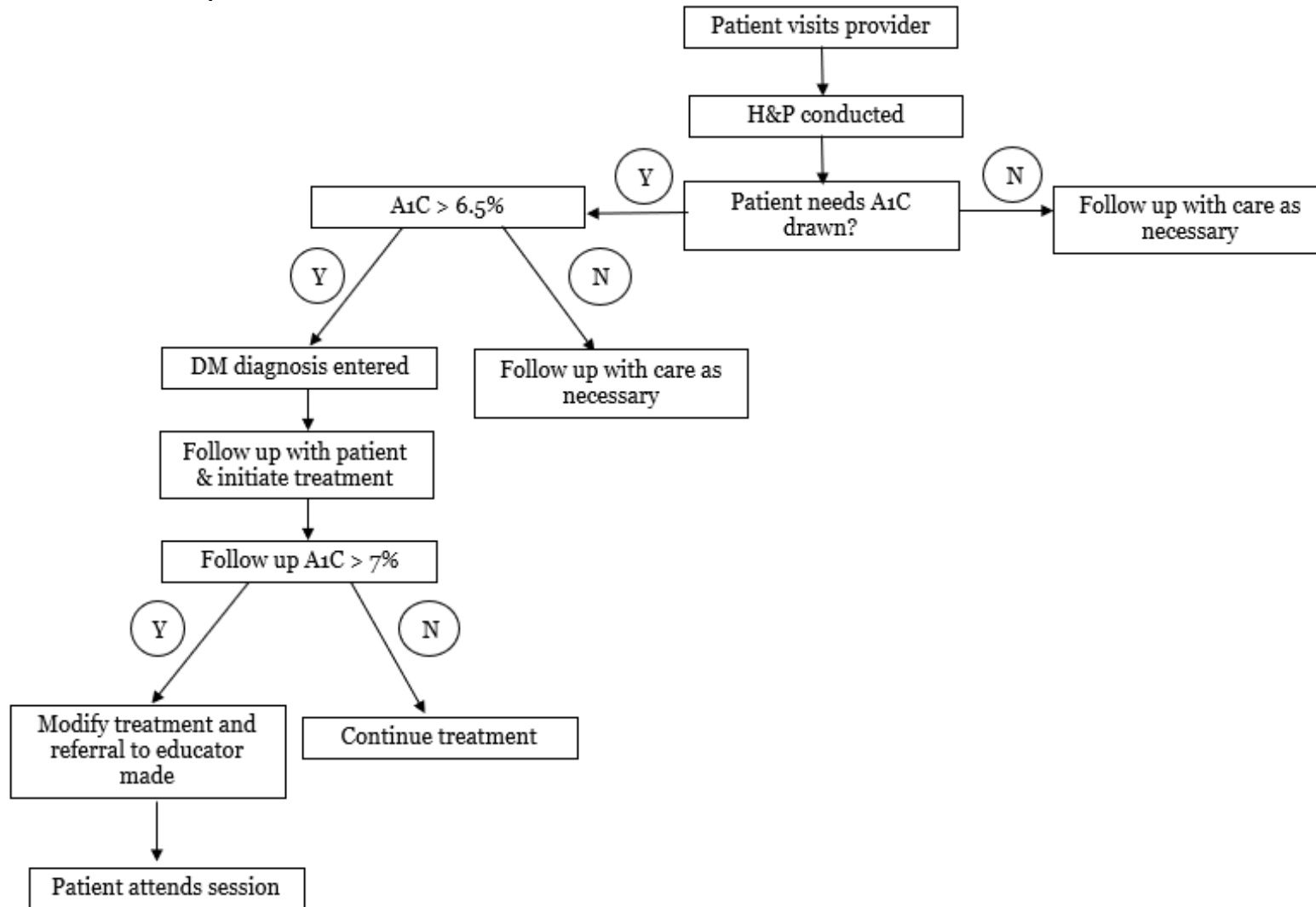
Promoting Action on Research Implementation in  
Health Services (PARiHS)



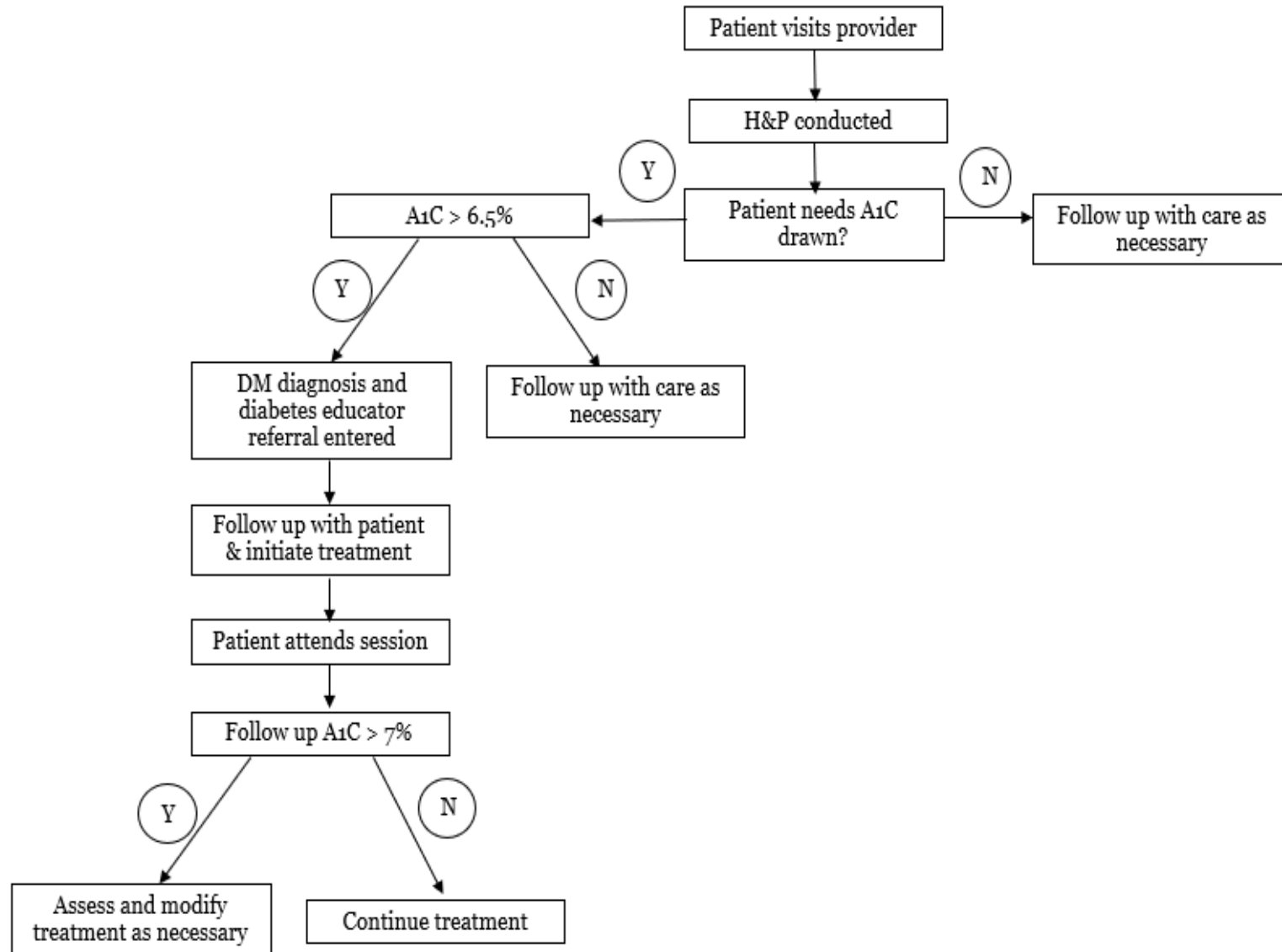


**Figure 3**

*Current Site Process Map*



**Figure 4**  
*Desired Site Process Map*



**Appendix A**

*Diabetes Education Referrals - Chart Audit Tool*

**DM Ed Referrals Chart Audit**

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Record ID

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MRN #

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A1C > 6.7%

- Yes
- No

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Date of diagnosis

---

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DM Ed Referral

- Yes
- No

---

Date of Referral

---

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Referral entered at time of diagnosis

- Yes
- No

Appendix C

*Policy*

<b>Title:</b>	Referrals to the Diabetic Educator
<b>Impacted Department/Unit:</b>	[REDACTED]
<b>Effective Date:</b>	8/30/2023

**Purpose:** The purpose of this protocol is to comply with the American Diabetes Association: Diabetes Self-Management Education and Support for Adults with Type 2 Diabetes Algorithm of Care. This evidence-based algorithm informs providers when to refer patients with type 2 diabetes to DSMES services.

**Procedure:** All adult patients with diabetes type 2 are to be assessed and referred for DSME provided by the Certified Diabetes Care and Education Specialist.

Providers are to assess and provide referral for Diabetes Self-Management Education and support services at the time of diagnosis, annually, when complicating factors develop, and when a transition in life or medical care occurs.

1. AT DIAGNOSIS
  - Newly diagnosed patients with type 2 diabetes should receive DSME
2. ANNUALLY
  - Not meeting treatment targets
  - Needs review of knowledge, skills, and behaviors
  - Maintain positive health outcomes
  - Unexplained hypoglycemia or hyperglycemia
  - For support to attain or sustain behavior changes
3. CHANGE IN COMPLICATING FACTORS
  - Change in:
    - i. Health conditions
    - ii. Planning pregnancy or pregnant
    - iii. Physical limitations – visual impairment, dexterity issues, movement restrictions
    - iv. Emotional factors – anxiety and clinical depression
    - v. Basic living needs – access to food, finances, and other social determinants of health
4. TRANSITION IN CARE
  - Change in:
    - i. Living situation, such as inpatient or outpatient rehabilitation or now living alone
    - ii. Medical care team
    - iii. Treatment change
    - iv. Age related changes affecting self-care

**Key Definitions:**

Diabetes self-management education and support – the ongoing process of facilitating knowledge, skills, and ability necessary for diabetes self-management

Certified Diabetes Care and Education Specialist (CDCES) – health care professional who completed training in clinical diabetes practice, passed certification, and has the responsibility to provide diabetes education

**References:**

- Centers for Disease Control and Prevention. (2019). Referral Process: Increasing Referrals and Overcoming Barriers to Participation. <https://www.cdc.gov/diabetes/dsmes-toolkit/referrals-participation/referral-process.html>
- Powers, M. A., Bardsley, J. K., Cypress, M., Funnell, M. M., Harms, D., Hess-Fischl, A., Hooks, B., Isaacs, D., Mandel, E. D., Maryniuk, M. D., Norton, A., Rinker, J., Siminerio, L. M., & Uelman, S. (2020). Diabetes Self-management Education and Support in Adults With Type 2 Diabetes: A Consensus Report of the American Diabetes Association, the Association of Diabetes Care and Education Specialists, the Academy of Nutrition and Dietetics, the American Academy of Family Physicians, the American Academy of PAs, the American Association of Nurse Practitioners, and the American Pharmacists Association. *Diabetes Care*, 43(7), 1636–1649. <https://doi.org/10.2337/dci20-0023>