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[PREPRINT] Counseling on Access to Lethal Means (CALM): An Evaluation of a Suicide Prevention Means Restriction Training Program for Mental Health Providers

Elizabeth Sale
University of Missouri–St. Louis

Michelle Hendricks
University of Missouri–St. Louis

Virginia Weil
University of Missouri–St. Louis

Collin Miller
University of Missouri–St. Louis

Scott Perkins
University of Missouri–St. Louis

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Corresponding Author:	Elizabeth Sale, Ph.D. University of Missouri-St. Louis St. Louis, MO - Missouri UNITED STATES
Corresponding Author Secondary Information:	
Corresponding Author's Institution:	University of Missouri-St. Louis
Corresponding Author's Secondary Institution:	
First Author:	Elizabeth Sale, Ph.D.
First Author Secondary Information:	
Order of Authors:	Elizabeth Sale, Ph.D.
	Michelle A. Hendricks, Ph.D.
	Virginia Weil, M.S.W.
	Collin Miller, M.S.W.
	Scott Perkins, M.S.W.
	Suzanne McCudden, M.A.
Order of Authors Secondary Information:	
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Abstract:	This paper evaluates the effectiveness of the Counseling on Access to Lethal Means (CALM) suicide prevention program. CALM trains mental health providers how to counsel suicidal individuals and those who support them on mean restriction during times of crisis. Pre/post/3-month follow-up assessments measured knowledge of lethal means, confidence and comfort in discussing means restriction (self-efficacy), and future intentions to counsel clients on means restriction. Change in the number of clients receiving lethal means counseling was also assessed. All constructs increased significantly at posttest. Confidence and counseling intentions were sustained at follow-up and significantly more clients received means counseling in the three months following the CALM training. Knowledge and comfort levels decreased at follow-up but not to pre-training levels. CALM is an effective means restriction training program. A template to assess clients for suicidality and lethal means access and booster sessions are recommended to further sustain effects.

Title Page with ALL Author Contact Information

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Authors:

Elizabeth Sale, PhD.
Michelle Hendricks, Ph.D.
Virginia Weil, M.S.W.
Collin Miller, M.S.W.
Scott Perkins, M.S.W.
Suzanne McCudden, M.A.

Missouri Institute of Mental Health
University of Missouri-St. Louis
4833 World Parkway Circle
St. Louis, MO 63134

Key Words: Lethal means restriction, suicide prevention**,** mental health counseling, gatekeeper training, firearms

Corresponding Author Information:

Elizabeth Sale, PhD
Missouri Institute of Mental Health
4633 World Parkway Circle
St. Louis, MO 63134-3115
liz.sale@mimh.edu
Phone: 314-516-8471
Fax: 314-516-8405

Counseling on Access to Lethal Means (CALM): An Evaluation of a Suicide Prevention Means Restriction Training Program for Mental Health Providers

ABSTRACT

This paper evaluates the effectiveness of the Counseling on Access to Lethal Means (CALM) suicide prevention program. CALM trains mental health providers how to counsel suicidal individuals and those who support them on mean restriction during times of crisis. Pre/post/3-month follow-up assessments measured knowledge of lethal means, confidence and comfort in discussing means restriction (self-efficacy), and future intentions to counsel clients on means restriction. Change in the number of clients receiving lethal means counseling was also assessed. All constructs increased significantly at posttest. Confidence and counseling intentions were sustained at follow-up and significantly more clients received means counseling in the three months following the CALM training. Knowledge and comfort levels decreased at follow-up but not to pre-training levels. CALM is an effective means restriction training program. A template to assess clients for suicidality and lethal means access and booster sessions are recommended to further sustain effects.

INTRODUCTION

Suicide is a significant public health issue in the United States that profoundly affects individuals, families, schools and communities. In 2014 it was the tenth leading cause of death and the number of deaths by suicide (42,773) far exceeded the number of deaths from motor vehicle accidents (35,398) and homicide (15,809). Furthermore, rates have been steadily increasing, rising from 11.06 per 100,000 in 2005 to 13.41 in 2014. Importantly, a significant proportion of adults and youth have serious suicidal thoughts and behaviors. According to the 2014 National Survey on Drug Use and Health (NSDUH), 3.9% of all adults 18 or older, or 9.4 million adults, had seriously considered suicide in the past year, and 0.5%, or 1.1 million adults, attempted suicide. The problem is more critical among youth. Responses to the 2013 Youth Risk Behavioral Surveillance System (YRBS) indicated that 17% of high school students (2.7 million youth) considered suicide at least once in the year prior to the survey and almost 8% (1.3 million youth) attempted suicide.

In response to this critical public health issue, many programs have been developed that focus on improving the mental health of suicidal individuals. This is particularly important given that almost 90% of individuals who take their lives by suicide have been diagnosed with some type of mental illness (Arsenault-

Lapierre, Kim & Turecki, 2004). Programs shown to effectively reduce suicidal thoughts and behaviors include Attachment-Based Family Therapy (Diamond et al., 2002; Diamond et al., 2010), Dialectical Behavior Therapy (Linehan et al., 1994; Safer, Telch & Agras, 2010), Dynamic Deconstructive Therapy (Gregory et al., 2008; Gregory, DeLucia-Deranja, E., & Mogle, J.A., 2010), and Multi-Systemic Therapy with Psychiatric Supports (Huey et al., 2004). Case manager follow-up after suicide attempts (Vergouwen et al., (2003) and pharmacotherapy (Dolgin, 2012) have also been shown to reduce suicidal ideation and suicide (Walrath et al., 2015).

Programs and policies restricting access to lethal means have also been shown to be effective in reducing suicides. More than half (51.5%) of suicides in the United States involve gun use (CDC, 2016), thus firearm restriction efforts have been a major focus in the United States. Approaches have included locked firearm storage and separate storage of ammunition and firearms (Miller, Azrael, & Hemenway, 2005), changes in firearm control laws (Andres & Hemstead (2011); Bridges, 2004) and firearm buy-back programs (Chapman et al. 2015). Non-firearm approaches have included restrictions on drug prescribing, packaging and purchasing (Crome, 1993; Hawton, 2002; Lester, 1999; Nielsen & Nielsen, 1992; Turvill, Burroughs & Moore, 2000), detoxification of gas (Kreitman, 1976; Lester, 1990), pesticide restriction programs (Bowles, 1995; Gunnell & Eddlestone, 2003), catalytic converter mandates on motor vehicles (Mott et al., 2002) and construction of structural barriers to suicide (Glasgow, 2011; Pirkis et al., 2013).

While laws and policies such as these have been shown to be highly correlated with reductions in suicide, additional means restriction approaches, including implementation of evidence-based lethal means reduction programs, are also warranted. However, though research supports the use of means restriction programs for suicide prevention (Ajdacic-Gross et al., 2006; Johnson et al., 2011), programs directly addressing lethal means are limited. Currently, the only lethal means restriction program listed on the SAMHSA or Suicide Prevention Resource Center (SPRC) best practice registries is the Emergency Department Means Restriction Education Program for emergency room personnel (Kruesi et al, 1999; Wisler et al, 1998).

In response to this need, approaches focusing on lethal means restriction are strongly supported in the 2012 National Strategy for Suicide Prevention (NSSP). Intended to set the direction for U.S. prevention initiatives, the NSSP calls for "efforts to reduce access to lethal means of suicide among individuals with identified suicide risk" (NSSP, 43). Specifically, the NSSP strongly encourages professionals who provide services to people at risk of suicide to routinely assess for access to lethal means. Assessments by mental health professionals are particularly

important, given that approximately 20% of individuals who take their lives have seen a mental health professional in the month prior to their suicide (Luoma, Martin & Pearson, 2002). Furthermore, according to Feldman & Freedenthal (2006), 87% of social workers had counseled a suicidal patient in a one-year period. Approximately half of psychiatrists and psychiatry residents have experienced at least one patient suicide (Ruskin et al., 2004). Among counselors, 71% have provided services to suicide attempters and 28% have had at least one client who took their life during the course of therapy (Rogers et al., 2001). However, while mental health professionals may have had general mental health training, they often lack adequate skills to specifically address lethal means restriction (Bryan, Stone & Rudd, 2011; Schmitz et al., 2012).

The Counseling on Access to Lethal Means (CALM) is intended to fill this void. Developed by Elaine Frank and Mark Ciocca at the Injury Prevention Center of the Children's Hospital at Dartmouth, CALM was designed specifically for mental health and crisis intervention professionals. Specifically, the program trains them how to counsel their clients to reduce the availability of lethal means if they are at heightened risk for suicide. CALM is currently listed on the Suicide Prevention Resource Center (SPRC) Best Practices Registry (BPR) under Adherence to Standards, but is not considered to be an "evidence-based" practice due to limited studies of program effectiveness. Only one outcome study, assessing implementation of CALM in New Hampshire, has been published to date (Johnson, Frank, Ciocca & Barber, 2011). Using a posttest/follow-up design, that study showed evidence of effectiveness in increasing counseling of clients' parents about lethal means access, and improving attitudes, beliefs and skills among training participants. This paper expands upon knowledge gained from that study using a pretest/posttest/follow-up design to evaluate the effectiveness of CALM among Missouri mental health providers.

The CALM Training Program

CALM trainings teach strategies to professionals to help them work effectively to reducing a suicidal client's access to lethal means in times of crisis. While CALM is intended to address the need to restrict access to all types of lethal means, there is a particular focus on firearms given its lethality in suicide attempts. Specifically, CALM workshop trainers inform participants about the prevalence of suicide and its warning signs, discuss different types of lethal means, present examples of effective lethal means reduction efforts, and instruct the participants how to most effectively work with individuals who are in immediate crisis and who possess firearms or other lethal means. The importance of addressing these issues with friends, family or others who have influence with the individual at risk and engaging their assistance is also stressed. CALM is not designed to discourage gun ownership

or use, but to encourage temporary removal when individuals are at extreme risk of suicide. The 90- to 120 minute training program includes slides, a video, and role plays for professionals to practice their skills. The video demonstrates how a health professional might work with a family to persuade them to temporarily remove firearms from the home because their adolescent son is contemplating suicide.

CALM in Missouri

In 2011, the Missouri Department of Mental Health (MDMH) was awarded a Substance Abuse and Mental Health Services Administration (SAMHSA) Garrett Lee Smith Youth Suicide Prevention Initiative grant. Through grant funding, suicide prevention trainers offered free CALM trainings to mental health providers and other professionals across the state, including emergency personnel and other first responders. Trainers were given the option of offering CALM by itself or in conjunction with Question, Persuade and Refer (QPR), a general suicide prevention training program (Quinnett, 1995). While the majority of trainers provided the full 2-hour version of CALM, one trainer also offered a 90-minute version that was preceded by QPR. This paper includes an analysis of the effectiveness of the full version of CALM and the differential effectiveness of the full and the abbreviated version of CALM combined with QPR.

METHODS

Procedures

The evaluation used a pre/post/3-month follow-up design with surveys completed by mental health professionals who participated in the CALM trainings. Because the number of other professionals trained was too small to allow for subgroup analysis, they were excluded from the evaluation. Participants completed paper/pencil questionnaires at the beginning and the end of the training and were asked if they were willing, to provide e-mail addresses giving consent for the evaluators to follow up with an on-line survey three months later. For programs that included both QPR and CALM, pretests were administered after the completion of QPR, which always directly preceded the CALM program training.

Each questionnaire took approximately five minutes to complete. Participants were asked to give the first and middle initial of their name and their birth month and day to allow researchers to link pretests, posttest and follow-up questionnaires. Participants were assured confidentiality and told that participation in the follow-up survey was voluntary and that they were not required to give their e-mail address. E-mail addresses, participant names and pre-post identification numbers were entered into Qualtrics, a web-based survey engine. A link to the

three-month follow-up survey was sent via a personalized e-mail on the final day of the third month. A thank you e-mail message was sent to those completing the survey 30 days after the original invitation was sent. Two reminder emails were sent to those who did not respond to the first request. Additionally, paper copies were mailed to those who did not respond to the on-line survey. Of the 433 mental health professionals who completed pretests, 399 completed posttests, 222 provided e-mail addresses for follow-up and 73 responded to the follow-up survey.

Participants

Respondents who completed pre/post surveys (N=399) were mainly female (82.9%), white (94.0%) and slightly more than half (54.8%) were under 35. More than half (57.8%) had participated in a suicide prevention program in the past and around one quarter (25.9%) had participated in a suicide prevention program that included information on lethal means restriction. Of those who completed three-month follow-up surveys (N=73), slightly more were female (87.7%) and fewer were under 35 (45.1%). Also, slightly more (65.8%) had participated in a suicide prevention program or a program including lethal means restriction information (31.5%). There were no differences in racial composition between baseline and follow-up participants.

Analyses were conducted to compare characteristics of those who completed the follow-up survey (N = 73) to those who completed pretest and posttests only (N = 399). Chi-square tests indicated no differences between those who completed a follow-up and the rest of the sample in regards to age, sex, race, or previous prevention training. However, there were significant differences in the CALM+QPR and CALM-only groups who completed follow-ups; 10.8% of the individuals in the CALM only group completed follow-ups compared to 26.6% of those in the CALM+QPR group ($\chi^2(1, N = 407) = 4.07$, $p < .05$). Furthermore, since the CALM-only group was smaller than the QPR+CALM group, only eight individuals from the CALM-only group completed the follow-up. Therefore, for the comparison of CALM+QPR and CALM-only groups, we focused on the pre- and post- test comparisons only. We then conducted a separate analysis with the entire combined sample to examine training effectiveness across three time points. For both analyses, we used repeated measures analysis of covariance (RM-ANCOVA). All pairwise comparisons used the Bonferroni correction to adjust for family-wise error rates.

Measures

The survey included 31 items, with questions related to both suicide and lethal means restriction. Items were clustered around four major domains: comfort in asking clients about suicidal thoughts and access to lethal means (3 items, $\alpha = .90$), counseling intentions (or likelihood of discussing means restriction and following up with

clients) (4 items; α = .95), knowledge related to suicide and means restriction (6 items, α =.64), discussions with clients about suicide and lethal means (2 items) and self-efficacy (7 items). Self-efficacy included two distinct constructs including provider confidence (5 items; α =.91) and comfort level in discussing suicide and lethal means restriction (2 items; α = .88).

Self-efficacy and counseling intentions questions were modeled on those developed by the evaluation team from a prior evaluation of gatekeeper training programs for the general public (α=.80). Sample self-efficacy questions included: "How comfortable are you talking to an individual about reducing their access to firearms?" and "How confident are you that you can effectively talk to an individual about reducing their access to medicine and chemical substances?" Sample counseling intentions questions included "If you recognize warning signs of suicide in an individual, how likely are you to discuss methods of reducing their access to lethal means?" Response options included extremely, very, somewhat, and not very, with extremely coded as 4 and not very coded as 1. Additionally, both at pretest and follow-up, participants were asked how many of the individuals they had talked with in the past three months exhibited suicide warning signs and how many individuals they talked with about restricting access to lethal means. Responses were coded on a 7-point ordinal scale where 1 = 0 and 7 = 26 or more. Knowledge items were based upon the CALM curriculum and the stated CALM objectives including questions such as: "What is the most common means of suicide for adults?" and "What percent of people who survive a nearly lethal attempt go on to die by suicide?" Responses were codes so that 1=Correct response and 0=Incorrect response. Participants were also asked to indicate their age, gender, race, and occupation and whether they had participated in a suicide prevention training and/or training on means restriction in the past.

The evaluation of the effectiveness of CALM was approved by the University of Missouri-St. Louis Institutional Review Board. There are no known conflicts of interest related to this research and all authors certify responsibility for the manuscript.

RESULTS

Pre/Post Comparisons (n=399).

To assess the short-term effectiveness of CALM and compare the effectiveness of the full 2-hour version of CALM to an abbreviated version combined with QPR, we conducted a 2 Time (Before CALM, After CALM) × 2 Training Type (CALM only, CALM+QPR) RM-ANCOVA controlling for whether the providers had previously participated in a suicide prevention training. The sample size was 399.

Self-Efficacy. For the confidence construct, there was a significant interaction ($F(1, 396) = 6.93$, $p < .01$), indicating that from pretest to posttest, both those who received QPR+CALM and those who received CALM only had significant gains in self-confidence in asking about lethal means ($p < .001$). The CALM-only group showed greater gains in confidence after the training than the CALM+QPR group (see Figure 1). For the comfort construct, there was a main effect of Time ($F(1, 394) = 131.01$, $p < .001$), indicating that both groups showed significant gains in comfort as a result of the training. The interaction effect was not significant ($F(1, 394) = 1.06$, $p > .05$). Likewise, counseling intentions showed a main effect of Time ($F(1, 392) = 76.78$, $p < .001$), indicating that counseling intentions to discuss means restriction increased significantly after the training for both groups (see Figure 1). There was no significant interaction effect ($F(1, 392) = .77$, $p > .05$).

Knowledge. There was a significant interaction effect for knowledge ($F(1, 392) = 12.67$, $p < .001$, partial eta squared = .03), indicating that, while both groups showed significant increases in knowledge after the training ($p < .001$), the CALM only group showed greater gains in knowledge after the training than the CALM + QPR group (see Figure 1).

Pre/Post/3-month Follow-up Comparisons (n=73)

To examine the effectiveness of CALM at 3-month follow-up, we conducted a three point-in- time (before CALM, after CALM, 3-month follow-up) RM-ANCOVA controlling for previous suicide prevention training for the self-efficacy and knowledge constructs. The sample size for this analysis was 73.

Self-Efficacy. For the confidence construct, there was a main effect of Time ($F(2, 71) = 31.45$, $p < .001$). Pairwise comparisons indicated that while there were significant gains made from baseline to post-training ($p < .001$), there was also significant loss from post-training to follow-up ($p < .001$; see Figure 2). Nonetheless, the data still show a significant increase from the baseline to the follow-up ($p < .001$), suggesting that training gains in confidence were diminished, but not completely lost during the follow-up period.

There was also a main effect of time for both comfort ($F(2, 142) = 9.57$, $p < .001$) and counseling intentions ($F(2, 70) = 4.92$, $p < .05$). Pairwise comparisons indicated significant gains from before to after the training for both variables (comfort: $p < .001$; counseling intentions: $p < .001$). The differences between post-training and the 3-month follow-up were *not* significant, suggesting increases in comfort and counseling intentions at posttest were maintained at the 3-month follow-up (see Figure 2).

Knowledge. As with attitudes, knowledge scores indicated a main effect of time ($F(2, 70) = 26.41$, $p < .001$). However, while knowledge increased significantly from baseline to post-test ($p < .001$), knowledge also decreased significantly from post-training to follow-up ($p < .001$). Indeed, knowledge scores at the follow-up were not significantly different from those baseline ($p = .10$), indicating that gains in knowledge as a result of the training were not sustained (see Figure 3).

Behavior. At baseline, 81% of CALM-trained mental health providers had previously spoken to one or more clients about *suicidal thoughts and/or behaviors.* This increased to 84% at follow-up, but this difference was not significant ($F(1,74) = .693$, $p = .41$). The percentage of providers who talked to clients about *reducing access to lethal means* was 57%; considerably lower than the percentage who spoke to clients about suicidal ideation. This increased to 74% at follow-up and this difference was significant ($F(1,73) = 7.65$, $p < .01$) (see Figure 4). Of those who had received prior training in lethal means restriction, 77% had spoken to one or more clients about means restriction at baseline. This increased to 86% at follow-up, but the difference was not statistically significant ($F(1,20)=.656$, $p=.48$). Of those who had not received prior lethal means training, the percentage increased from 42% to 61% and this difference was significant ($F(1,42) = 9.67$, $p<.01$).

DISCUSSION

Pre/Post Findings. Analyses of responses from mental health professionals demonstrated short-term gains in knowledge, self-efficacy and lethal means counseling intentions for both the QPR+CALM and the CALM-only trainings. The longer CALM-only version was shown to be slightly more effective at increasing confidence in discussing means restriction and teaching participants facts related to both suicide and lethal means. However, both the CALM and CALM+QPR versions showed increases in comfort and counseling intentions. Overall these findings suggest that both versions are effective in addressing means restriction. Use of the CALM-only version may further strengthen program outcomes.

Open-ended responses regarding program effectiveness reflected these positive findings. Comments included “CALM gave concrete examples of how to talk to someone on getting guns out of house,” “the program cleared up some misconceptions I previously had,” and “CALM made me feel more comfortable talking with people in crisis and gave me great resources to refer them to.” An updated video was the most requested program revision mentioned.

Follow-Up Findings: The use of a follow-up design allowed us to examine whether changes in comfort and confidence levels, counseling intentions and knowledge were sustained over time. Our analysis showed that with respect to *comfort*, statistically significant pre/post gains were sustained at three-month follow-up and suggest that CALM can have lasting effects in making providers feel more comfortable when addressing suicide and lethal means restriction with their clients. Similarly, *counseling intentions* increased significantly from pretest to posttest and were sustained after three months. Taken together, these findings suggest that as providers become more comfortable talking about lethal means restriction with their clients, they are more likely to ask clients direct questions related to means restriction and more likely to follow up with their clients to explore whether their access to lethal means has decreased, particularly during crisis situations when clients may be most vulnerable to suicide.

Confidence also increased in the follow-up sample between pretest and posttest, but unlike comfort and counseling intentions, levels dropped significantly from posttest to follow-up. However, follow-up confidence levels were still significantly higher than those at baseline. A closer examination of baseline comfort and confidence levels may help to explain the discordance between the findings for these two related concepts. For example, among the several items related to comfort and confidence, the survey contained one comfort and one confidence question specifically related to firearms restriction. Specifically, providers were asked, "How comfortable are you talking to an individual about reducing their access to firearms" and "How confident are you that you can effectively talk to an individual about reducing their access to firearms?" Nearly one-third (31.6%) of providers at baseline felt extremely *comfortable* discussing lethal means with their clients but far fewer (12.7%) felt extremely *confident* that could effectively discuss the topic. Additionally, the same pattern appears at follow-up. While comfort and confidence levels both decreased, decreases in confidence were much more precipitous (and statistically significant) compared to decreases in comfort which were not statistically significant. These findings suggest that generally speaking, CALM makes providers feel more comfortable discussing difficult topics such as suicide and means restriction but that additional efforts may be needed to boost their confidence.

Follow-up findings related to *knowledge* of suicide and lethal means restriction showed similar patterns to those related to confidence. Knowledge increased significantly immediately after the training program but declined three months later. However, unlike confidence, baseline and three-month differences in knowledge were not statistically significant, suggesting that knowledge retention can be even more challenging than maintaining

provider confidence. Again, booster sessions reinforcing the information gained during the training program may help to maintain the positive immediate effects that occurred directly after the CALM training.

Finally, we examined whether the CALM program had changed counseling *behaviors* both in terms of suicidal ideation and means restriction. With respect to suicidal ideation, analysis of baseline responses indicated that most providers (81%) had spoken to their clients about suicidal thoughts and/or behaviors prior to the CALM training. Given that a majority of providers had already participated in suicide prevention training (62%), this finding is not surprising but leaves little room for improvement. Indeed, while more providers (84%) did counsel clients about suicidal ideation after three months, this increase was not significant. With this high base rate, achieving statistical significance is challenging. Some providers may never change their counseling behaviors absent a very intensive intervention, and all mental health providers do not necessarily have direct client contact. In this sample of providers, six of the 79 providers (7.5%) had no client contact before or after CALM.

Unlike the findings related to suicidal ideation, providers spoke with a significantly higher number of clients about *means restriction* three months after the CALM training compared to the three months prior to the CALM training. At baseline, 57% of providers had spoken to at least one individual about means restriction and this rose to 77% at three-month follow-up. The increase occurred mainly among those who had never been exposed to means restriction training. The discrepancy between these findings and those related to discussion about suicidal ideation is most likely the result of a stronger emphasis in the CALM training on means restriction than suicidal ideation. Additionally, fewer providers had received means restriction training than suicide prevention training before the CALM training (29% compared to 62%) leaving more room for improvement. While these findings are extremely encouraging, additional booster sessions may be warranted to further increase means restriction discussions.

In sum, this analysis suggests that CALM is an effective lethal means restriction program for mental health providers. Specifically, we demonstrated that CALM increased knowledge, comfort, confidence and likelihood of follow-up discussions related to client access to lethal means. Further, CALM training increased the number of clients with whom providers spoke about access to lethal means. While booster sessions are encouraged to further educate and empower providers, our results support use of CALM to further educate and train mental health providers to better serve their suicidal clients.

Some study limitations warrant further research. First, as noted above, most providers who completed the follow-up survey had participated in the CALM+QPR version of the program, thus comparing long-term effects of CALM+QPR and CALM-only trainings was not possible. Second, use of a convenience sample and the lack of a comparison or control group limits the ability to assess whether findings were the result of CALM or exposure to other programming, though the authors are unaware of any means restriction training programs for mental health professionals and no such programs are on best practice lists. Next, study findings would be strengthened with a larger sample size, though the number of providers surveyed was sufficient to detect strong effects. Additionally, expanding the study pool to include first responders and other professionals who deal directly with suicidal clients will increase the ability to generalize findings to other populations. Finally, extending the follow-up time period beyond three months will allow for assessment of CALM's long-term impact. Despite these limitations, our findings are extremely promising. CALM is an important suicide prevention program and should be considered by any mental health professional working with suicidal clients and their families.

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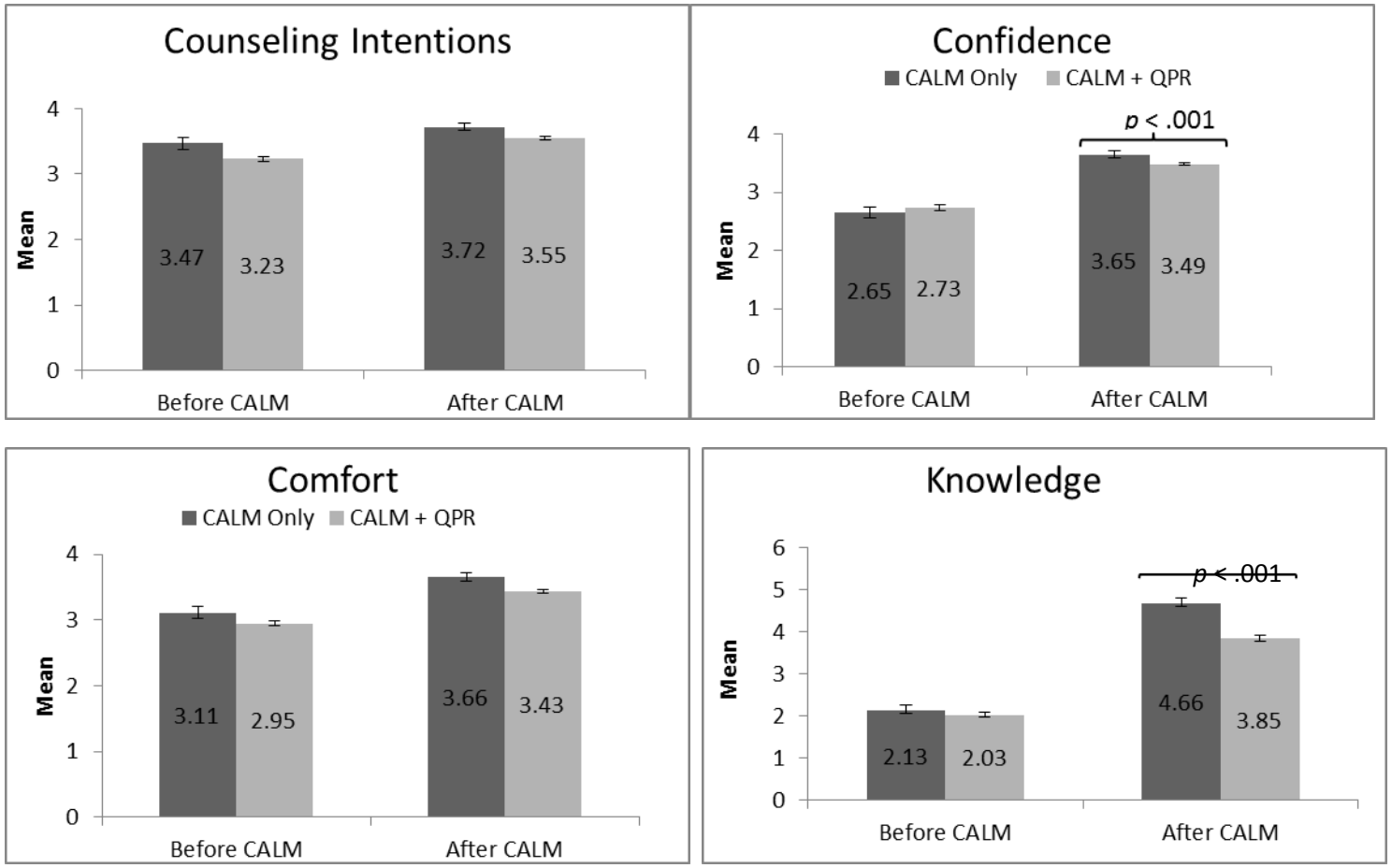
Figure 1

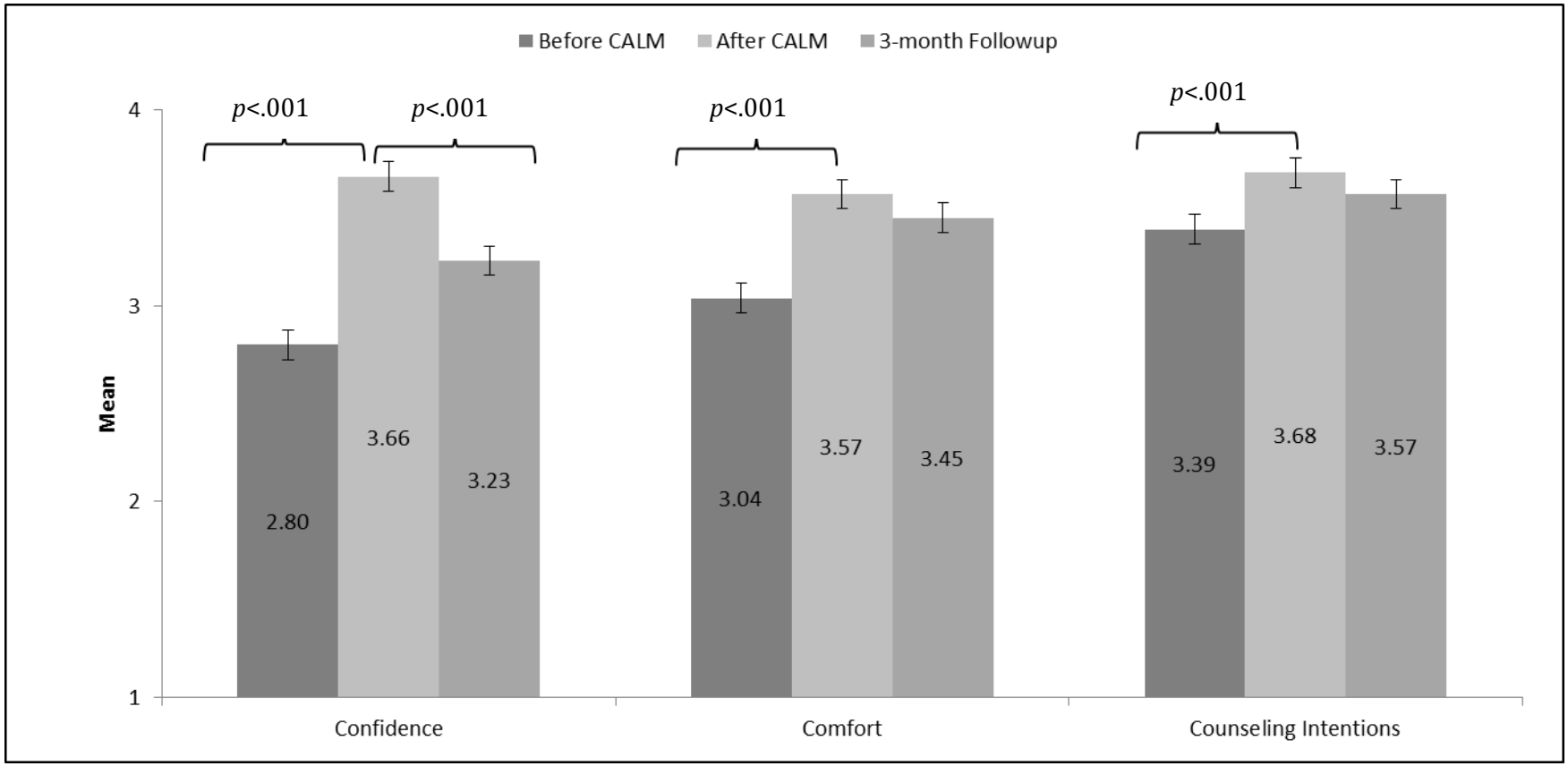
Figure 1. Comparison of CALM only and CALM+QPR groups in Confidence, Comfort, Counseling Intentions and Knowledge Before and After the CALM training (N = 399).



Note: Error bars represent standard error of the mean. All before and after training comparisons are significant at the $p < .05$ level.

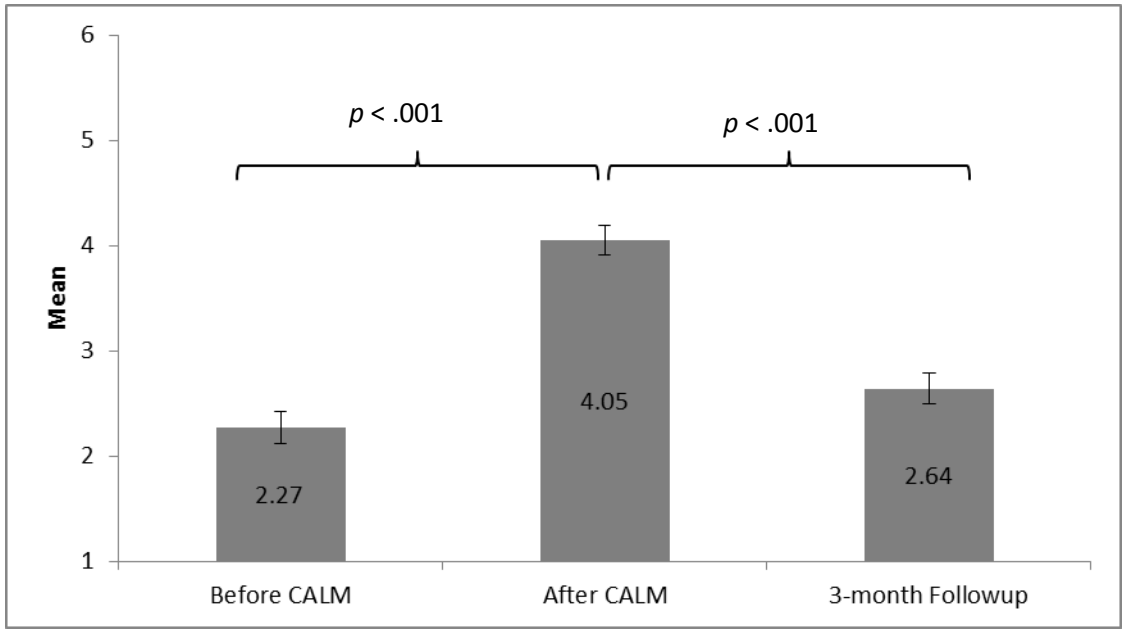
Figure 2

Figure 2. Effectiveness of CALM at the 3-month Follow-up: Confidence, Comfort and Counseling Intentions (N = 78)



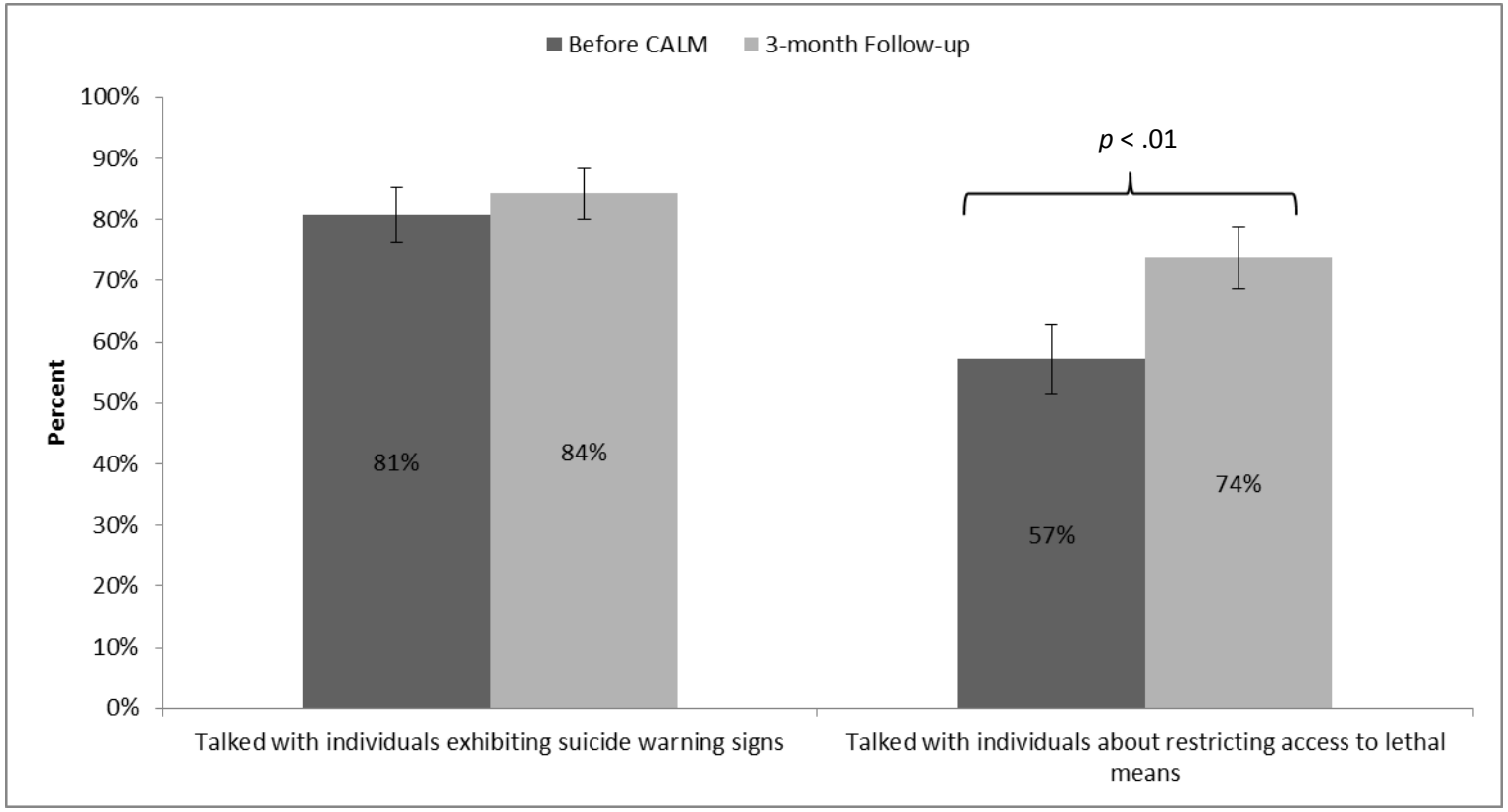
Note: Error bars represent standard error of the mean.

Figure 3. Effectiveness of CALM at the 3-month Follow-up: Knowledge (N = 78)



Note: Error bars represent standard error of the mean.

Figure 4. Effectiveness of CALM at the 3-month Follow-up: Behavior (N = 78)



Note: Error bars represent standard error of the proportion.