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Are There Demonstrable Effects of Distant Intercessory Prayer?

A Meta-Analytic Review

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Abstract

Background: The use of alternative treatments for illness is common in the United States. Practitioners of these interventions find them compatible with personal philosophies. Consequently, distant intercessory prayer (IP) for healing is one of the most commonly practiced alternative interventions and has recently become the topic of scientific scrutiny.

Purpose: This study was designed to provide a current meta-analytic review of the effects of IP and to assess the impact of potential moderator variables.

Methods: A random effects model was adopted. Outcomes across dependent measures within each study were pooled to arrive at one omnibus effect size. These were combined to generate the overall effect size. A test of homogeneity and examination of several potential moderator variables was conducted.

Results: A total of 14 studies were included in the meta-analysis yielding an overall effect size of g = .100 that did not differ from zero. When one controversial study was removed the effect size reduced to g = .012. No moderator variables significantly influenced results.

Conclusions: There is no scientifically discernable effect for IP as assessed in controlled studies. Given that the IP literature lacks a theoretical or theological base and has failed to produce significant findings in controlled trials, we recommend that further resources not be allocated to this line of research.

Are There Demonstrable Effects of Distant Intercessory Prayer?

A Meta-Analytic Review

Both lay and professional interest in non-medical treatments for illness has grown exponentially in recent years. Perhaps the greatest evidence of this trend is the establishment of the National Center for Complementary and Alternative Medicine (NCCAM) within the U.S. National Institutes of Health. In 2002, 62% of Americans reported using some kind of alternative medicine (1). In a study examining the characteristics of individuals who use alternative treatments, Astin (2) found that they tended to be well-educated and in poor health status but *not* largely dissatisfied with conventional medicine. Rather, these individuals found that the alternative treatments were more congruent with their own values, beliefs, and philosophical orientations toward health and life in general. NCCAM has been specifically interested in studying therapies for which there is no plausible biomedical explanation currently accepted by the biological and medical communities. This category includes many traditional folk health practices as well as practices based on ideas related to quantum physics or new age ideologies.

Of the 10 most often utilized alternative medicine procedures in the U.S., prayer for self (43%) and prayer for others (24.4%) are the two most commonly named therapies and being in a prayer group (9.6%) ranks fifth (1). Prayer is a quintessential example of a health practice that is rooted in one's beliefs and philosophical orientation toward life and the cosmos. Nevertheless, it is important to note that prayer in and of itself may not qualify as a treatment that lacks a plausible biomedical explanation. For example, when ill individuals engage in prayer for themselves the psychologically soothing or reassuring qualities of the experience could trigger recognized psychophysiological and psychoneural processes that plausibly influence health and

healing. Thus, this type of prayer certainly falls into the category of an alternative medical procedure, but not one lacking theoretical credibility.

Prayer for oneself is, however, not the focus of this investigation. Rather this meta-analysis investigated the effects of distant intercessory prayer (IP). Simply defined, IP is prayer said on behalf of someone else but the person doing the praying (i.e., the intercessor) is not present with the recipient of the prayer, thus making the prayer distant. Practitioners of many of the world's religions offer up prayers for both the ill as well as for those who are not ill, for example when traveling mercies are requested. These are sometimes said during religious services or during rituals, such as laying on of hands or anointing with oil, where the individual is present and aware that the prayer and ritual are occurring. Another type of prayer occurs when intercessors pray for individuals who are not present with them and may, in fact, not even know that they are being prayed for. These are also common in many faith traditions and are a form of IP. In short, many believe that prayer is effective in and of itself and it does not require that the recipient of the prayer be an active participant in either the prayer or in the knowledge of being prayed for. This point is significant as an important feature of the studies to be examined in this meta-analysis is that the participants (mostly patients) did not know if they were receiving prayer, i.e., they were blind as to whether they were in the prayer or control group. Likewise, their health care providers were also blind to prayer condition. Further, in some studies the participants did not know that they were participating in a study at all, constituting a type of triple blind design. By implementing these rigorous methodological procedures the authors of these studies removed known psychological processes or placebo effects from the set of possible explanatory mechanisms that could account for significant findings.

We should note that we are not the first to consider the literature pertaining to IP but this meta-analysis is the most comprehensive and up-to-date quantitative review of the literature and includes the first published multi-center IP intervention study (3), a study not available to previous reviewers. It is also notable that prior authors reached highly discrepant conclusions regarding the proper future course for this research. Whereas Powell, Shahabi, and Thoresen (4) concluded that there was some evidence for the effectiveness of IP and that carefully designed trials were critical to advance understanding in this area, Sloan (5) emphatically stated that further study of IP is simply not justified. In a Cochrane Review of the IP literature (6) first published in 2000 and updated in October, 2003, the authors concluded that their review provided no guidance regarding the effectiveness of IP.

The purpose of this study was to provide a current meta-analytic review of the effects of IP and to assess the impact of potentially significant moderator variables. Studies included in this review were specifically chosen because they investigated IP rather than (or in addition to) other forms of distant healing that have appeared in the literature. We were only interested in IP due to its prominence in the culture and currently topical, but controversial, stature in behavioral medicine.

Method

Search Criteria

In order to locate all relevant studies, PsycInfo and Medline databases were searched using the terms “intercessory prayer” and articles published prior to August, 2005 were eligible for inclusion. References in relevant review articles (6-9) were also searched as were reference lists from articles included in the meta-analysis. To meet inclusion criteria studies must have: a)

used IP as an intervention to treat any type of medical or mental health problem; b) provided data that allowed for calculation of an effect size; c) compared IP to a control group; and, d) blinded participants as to their experimental condition. It was not required that participants be unaware of their participation in a study. This strategy yielded a total of 15 studies (noted by an asterisk in the reference list). One study was excluded because it examined the impact of "retroactive" intercessory prayer on patients with a prior blood infection (10). The outcomes of participants had been established prior to the implementation of IP; consequently, we did not understand how this could be considered a prayer intervention and hence decided that it did not merit inclusion. All other IP intervention studies were included.

Statistical Analysis

Outcomes across all dependent variables were pooled within studies to provide one omnibus effect size for each study. Effect sizes across studies were weighted by their inverse variance in order to provide an overall effect size estimate that most accurately represented the true population effect size (11).

Level and detail of data reporting varied widely across primary studies. Consequently, effect sizes were computed from means and standard deviations when possible. In their absence, effect sizes were calculated from t-tests and F-tests. Effect sizes from dichotomous outcome measures were computed using procedures described in Hasselblad & Hedges (12), who provided a method for transforming odds ratios from dichotomous data into effect sizes by using the following formula: $d = \frac{\log OR * \sqrt{3}}{\pi}$. After all effect sizes were calculated, they were converted to Hedges' *g*, which corrects for a small bias in Cohen's *d* (11). All effect sizes were calculated using Comprehensive Meta-Analysis software (13).

A random effects model was deemed most appropriate for this research area given its heterogeneity and limited number of studies. This method allows for greater generalization than the fixed effects model (14) but a random effects meta-analysis is typically more conservative than a fixed effects meta-analysis (i.e., less likely to reject the null hypothesis that the overall mean effect size is zero). Knowing this, and given that this research area could be described as early stage, we opted for flexibility by also calculating effect sizes using the fixed effects model. The results of the random and fixed effects model analyses were virtually identical; consequently, only the results of the random effects model are reported.

Moderator Analysis

A test of homogeneity, using *Q,* was performed to examine whether the set of effect sizes were distributed around a common mean. Although a test of homogeneity that fails to reject the null hypothesis argues against the existence of moderator variables, such a test often lacks sufficient statistical power to detect moderators (15). Thus, in addition to homogeneity tests, we conducted moderator analyses based on participant characteristics and study design features, as both of these sets of variables are often related to findings in other areas investigating treatment outcomes. We specifically examined the potential impact of participant type, method of allocation of participants to conditions, frequency of prayer, and duration of prayer intervention.

Participants were divided on the basis of whether they were from a patient population, i.e., individuals seeking medical or psychological intervention for some type of physical or mental problem, or were more representative of a healthy-analogue sample. In the latter case the research participants were not seeking treatment but received prayer for another reason. For example, in one study (16) the participants reported a difficult life situation that was then the

object of prayer. The effect of prayer on participants currently receiving treatment for illness (medical or mental health services) was compared to the effect on participants with no identifiable health problems. This moderator analysis utilized a *Q*-test for comparing effect sizes between groups, a frequently used meta-analytic analog to the analysis of variance (17).

The moderator of method of assignment to treatment condition was examined by comparing the mean effect size of studies utilizing random assignment to studies that did not use random assignment. To assess the impact of prayer frequency, the effect of prayer was examined for participants who were prayed for daily versus those prayed for less than daily. Both of the above analyses utilized *Q*-tests. Due to the wide variation in intervention duration, the impact of this variable was examined using weighted least squares (WLS) regression, with each study's inverse variance as the weighting variable.

It also seems possible that type of prayer (directive, nondirective, silent meditation, etc.) could influence the efficacy of prayer intervention. Unfortunately, due to lack of specific information presented in the studies, we were only able to broadly lump type of prayer into either directive or nondirective categories (Table 1), potentially leaving much variance within classes. After making this classification it became apparent that because of the relative lack of pure non-directive prayer conditions, this analysis could not be carried out. Finally, it is possible that the religious beliefs of intercessors may moderate the effects of intercessory prayer. Eight studies explicitly examined the effects of intercessory prayer as performed only by Christians. It may thus appear possible to compare effects between Christian intercessors and others. However, such an analysis would be misleading, as it is likely that most of the intercessors in the studies in which intercessor faith was not clearly reported were Christian. Indeed, only one study

mentioned including non-Judeo-Christian intercessors (3). Thus, the moderating influence of intercessor faith was not examined.

Results

Study Characteristics

Important characteristics of the individual studies included in this analysis can be seen in Table 1 and it should be referred to throughout this section. Eleven studies utilized participants who were diagnosed with some sort of medical or mental health condition whereas three studies used healthy participants. In all 14 studies participants were blind to treatment condition and in many cases the study blind was so thorough in that neither patients nor attending physicians and nurses were aware that a study was being conducted. Eleven studies randomly assigned participants to conditions. Other studies used a multiple baseline across subjects design (18), matched assignment (19), and a combination of random assignment and assignment by time (20). Studies varied widely in the lengths of their interventions, from a minimum of approximately one week (actually was time to hospital discharge which averaged 7.6 days) (21) to 15 months (22). A great deal of heterogeneity was present in the frequency of prayer across studies ranging from once weekly to daily, with eight studies implementing daily prayer. The studies demonstrated high variability regarding the number of dependent variables reported with one listing 40 measures (23) and another utilizing only one (24).

Effects of Intercessory Prayer

Across the 14 studies, using a random effects model, the mean effect size was .100, which did not reach statistical significance (see Table 2 throughout). The findings for each individual study and the overall result are graphically portrayed in Figure 1. A moderator

analysis based on patient health achieved borderline significance, suggesting more positive change for patients during IP intervention than for healthy participants (Q = 2.86, p = .091). When only studies examining ill patients were considered, the mean effect size, while small, achieved statistical significance, whereas healthy participants showed no benefit from intercessory prayer (Table 2).

One study with a large effect size supporting the efficacy of IP (25) turned out to be unusual in a number of ways (26,27). When originally published, the study had three authors. However, one author removed his name from the study, stating that he only provided editorial input for the investigation which did not merit inclusion as an author. Another author, Wirth, was recently convicted of fraud-related charges unrelated to the study and a newspaper report (27) casts considerable doubt on whether the prayer groups in the study were actually conducted. We thought that the strange circumstances surrounding this article warranted examination of the overall results both including this study and excluding it from consideration.

When Cha & Wirth (25) was removed from the analysis, the omnibus effect size across studies diminished to nearly zero (g = .012) and the moderator analysis no longer yielded a significant difference between sick and healthy participants (Q = .82, p = .37). Further, the previously reported small effect size in support of the efficacy of IP among sick patients was no longer significant.

A comparison of the effect of IP on subjects randomly assigned to conditions versus participants non-randomly assigned revealed no significant difference (Q = .038, p = .85). In addition, the mean effect size of studies that utilized daily prayer showed no significant difference compared to studies that utilized less frequent prayer (Q = .33, p = .57). A WLS

regression analysis revealed no relationship between mean effect size and duration of prayer intervention ($\beta = -.02$, $p = .94$). The above analyses indicate that study design characteristics did not serve as moderator variables in this analysis.

A test of homogeneity yielded nonsignificant results ($Q = 15.07$, $p = .30$), indicating that the studies were likely clustered around a common mean that is reasonably representative of each study in the set.

Discussion

This study provides a quantitative review of the research addressing the potency of IP for improving one's physical condition or life circumstance. The most parsimonious statement to be made from this literature is that there is no scientifically discernable effect that differentiates the status of individuals who are the recipients of IP from those who are not. Further, there was no evidence to suggest that these results were influenced by potential moderators such as method of allocation of research participants to groups (random vs. non-random), prayer dosage, i.e., whether prayers were offered at least daily or less often, or how long the prayer intervention lasted. Though an initial analysis seemed to indicate the possibility that an effect could be found that differentiated studies on the basis of whether the recipients of prayer were actual medical patients or healthy individuals receiving prayer for other reasons, this effect vanished when one highly controversial and somewhat doubtful study was removed from the analysis.

It should be pointed out that all of these studies suffer from a major and unsolvable methodological flaw, i.e., receipt of prayer cannot be controlled and therefore it is impossible to know to what degree individuals in the control groups were actually the recipients of the "intervention" (IP) from loved ones, family members, clergy, or others apart from the research

intercessors. Krucoff et al (3), in a multicenter study that is certainly the most robust study to date, noted that 89% of their cardiac patients (undergoing percutaneous coronary intervention or elective catheterization) were aware that prayer on their behalf was being offered outside of the study protocol. Further, 64% of those *not* assigned to the prayer group believed that they were assigned to it whereas only 35% of those in the prayer group believed that they were not. Thus it could be argued that virtually all subjects receive prayer or at least believe they do. Given this situation, perhaps the conclusion cited above should be amended to state that there is no scientifically discernable effect that differentiates the status of individuals who are the recipients of IP *initiated by a research team* from those who do not receive *research team initiated IP*.

In the absence of supportive empirical data the role of a defensible theoretical rationale gains greater prominence if this line of research is to continue. However, the development of such a rationale may, in and of itself, prove challenging. Chibnall and colleagues (28) offered a brilliant criticism of the theoretical and methodological underpinnings of this research and pointed out many significant and seemingly insurmountable logical difficulties with IP studies. Masters (29) noted that the preponderance of IP studies have been carried out by those of Christian heritage. He then offered a critique from a distinctly Christian perspective that suggested there is no basis in Christian theology or its world-view to support further IP research. Sloan (5) incorporated many of these same arguments into his critique and further places this research outside the bounds of what is scientifically discernible. Interested readers are referred to these sources for detailed analysis of this research at the theoretical and methodological levels. We believe that when these factors are considered in concert with the results of this meta-

analysis there is simply no reason to continue supporting research on IP if the purpose of that research is to demonstrate an effect for the recipients of IP when compared to non-recipients.

Lacking a theoretical foundation, it appears that this area of research has continued at least in part as a function of the misinterpretation of visible early studies. For example, the Byrd (21) study is often referred to as the starting point for this research and is presented as an example of a study demonstrating the efficacy of IP. However, this study actually included 30 dependent variables and found significant effects, without using any type of alpha correction for multiple comparisons, for only seven of them. The one finding from this study that is most often cited in support of the potency of IP is the global rating of the patients' hospital stays. However, when Harris and colleagues (23) attempted to replicate Byrd's finding using the global scale Byrd developed, they were unable to do so. Further, Byrd found no differences on seemingly very important variables such as days in the cardiac care unit, days in the hospital, or mortality. Interpretation of this study as supportive of the benefits of IP seems dubious at best.

A couple of final caveats are in order for proper perspective. First, we did not study prayer for one's self or prayer said in the presence of the prayer recipient. The present research has nothing to say about these practices. We are also *not* trying to persuade believers to stop their practice of IP as it is carried out within their faith traditions. We see no health risk to patients or others from IP and, in fact, believe that there may be as yet unspecified and unstudied benefits for the intercessors themselves. We encourage those interested in how spiritual variables may impact health to investigate areas of research that are grounded in theoretically defensible constructs and related models. Nevertheless, given that the IP literature lacks a theoretical or

theological base and has failed to produce significant findings in controlled trials, we recommend that further resources not be allocated to this line of research.

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Table 1.

IP Studies Included in Meta-Analysis

Study	Prayer Type	Intercessors' Faith	Condition	g[1]	N
Aviles et al., 2001	Unknown	Unknown	CCU[2]	.068	762
Byrd, 1988	Directive	Christian	CCU	.296	393
Cha & Wirth, 2001	Directive	Christian	Fertility Clin.[3]	.576	167
Collipp, 1969[4]	Directive	Christian	Leukemia	.803	16
Harris et al, 1999	Both[5]	Christian	CCU	.097	990
Joyce & Welldon, 1965	Nondirective	Christian	Various	.163	32
Krucoff et al., 2005	Unspecified	Variety[6]	CAD[7]	-.018	748
Mathai & Bourne, 2004	Unspecified	Unknown	MH[8]	-.274	336
Matthews et al., 2000	Directive	Christian	RA[9]	-.001	40
Matthews et al., 2001	Directive	Christian	Kidney Dia[10]	-.075	94
O'Laoire et al., 1996	Both	Unknown	Healthy	-.098	277
Palmer et al., 2004	Unknown	Christian	Healthy	-.015	68
Tloczynski & Fritsch, 2002	Directive	Unknown	Healthy	.590	8
Walker et al. 1996	Nondirective	Christian/Jewish	Alcohol Tx.	.425	34

Table 1 continued

[1] = positive value for *g* represents a positive effect for intercessory prayer; [2]CCU = coronary care unit; [3]Fertility Clin. = patients at a fertility clinic prayed for pregnancy; [4]In this small N study two patients, both in the control group, had a different and more deadly form of leukemia than the other patients. They were excluded from the analysis; [5]Both = prayers were both directive and nondirective; [6]Variety = Christian, Muslim, Jewish, and Buddhist; [7]CAD = coronary artery disease; [8]MH = various mental health problems; [9]RA = rheumatoid arthritis; [10]Kidney Dia. = patients on kidney dialysis

Table 2

Effects of IP Summarized Across Studies

Condition	N of Comp.[1]	*g*[2]	*Z*	*p*
Overall	14	.100	1.35	.18
Patient	11	.169	1.93	.05
Healthy	3	-.061	.58	.57
Patient (without Cha & Wirth, 2001)	10	.066	.72	.47
Overall (without Cha & Wirth, 2001)	13	.012	.17	.87

[1] = number of comparisons; [2] = positive value for g represents a positive effect for IP

Figure 1

Forest Plot of Effect Sizes and Confidence Intervals for Individual Studies and Overall