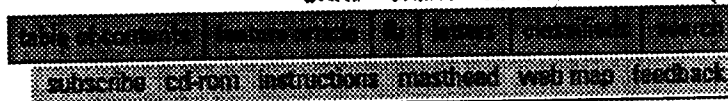



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## Feature Article

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### Does Prayer Influence the Success of *in Vitro* Fertilization–Embryo Transfer?

*Report of a Masked, Randomized Trial*

Kwang Y. Cha, M.D., Daniel P. Wirth, J.D., M.S., and Rogerio A. Lobo, M.D.

**OBJECTIVE:** To assess the potential effect of intercessory prayer (IP) on pregnancy rates in women being treated with *in vitro* fertilization–embryo transfer (IVF-ET).

**STUDY DESIGN:** Prospective, double-blind, randomized clinical trial in which patients and providers were not informed about the intervention. Statisticians and investigators were masked until all the data had been collected and clinical outcomes were known. The setting was an IVF-ET program at Cha Hospital, Seoul, Korea. IP was carried out by prayer groups in the United States, Canada and Australia. The investigators were at a tertiary medical center in the United States. The patients were 219 women aged 26–46 years who were consecutively treated with IVF-ET over a four-month period. Randomization was performed after stratification of variables in two groups: distant IP vs. no IP. The clinical pregnancy rates in the two groups were the main outcome measure.

**RESULTS:** After clinical pregnancies were known, the data were unmasked to assess the effects of IP after assessment of multiple comparisons in a log-linear model. The IP group had a higher pregnancy rate as compared to the no-IP rate (50% vs. 26%,  $P=.0013$ ). The IP group showed a higher implantation rate (16.3% vs. 8%,  $P=.0005$ ). Observed effects were independent of clinical or laboratory providers and clinical variables.

**CONCLUSION:** A statistically significant difference was observed for the effect of IP on the outcome of IVF-ET, though the data should be interpreted as preliminary. (J Reprod Med 2001;46:781–787)

**Keywords:** fertilization *in vitro*, embryo transfer, prayer, complementary medicine, alternative medicine.

**Our data suggest a benefit of IP  
on IVF-ET.**

#### Introduction

*In vitro* fertilization–embryo transfer (IVF-ET) has emerged over the last 20 years as a viable option for the treatment of infertility. While the pregnancy rate was low in the first decade, in recent years the success rate has been increasing. The pregnancy rate for IVF-ET increased from 20.7% deliveries per retrieval in 1984<sup>1</sup> to 28% in 1997<sup>2</sup> (the last United States survey). Several factors have contributed to the increased success of IVF-ET.<sup>3–6</sup> Among these are the greater experience of the clinical teams and the use of certain regimens, such as with a GnRH agonist.<sup>7</sup> However, it is generally agreed that advances in the laboratory that result in good-quality embryos are perhaps the most significant reason why the success rate of IVF-ET has increased.<sup>5,8</sup> Variations between the practices of physicians also has been suggested as influencing

success rates,<sup>9</sup> as have biologic factors, such as cycle-to-cycle variability. These factors warrant further assessment by prospective, randomized trials.

Use of alternative or complementary medicine has been increasing in popularity.<sup>10</sup> These approaches include the use of healing touch and prayer, with several reports suggesting a potential therapeutic benefit in a variety of disorders.<sup>11,12</sup> However, from an evidentiary medical perspective, these reports have not been substantiated.<sup>13</sup> Specifically, intercessory prayer (IP) has been studied, and while preliminary experiments have been interpreted as suggesting a possible improvement in patients with heart disease and AIDS,<sup>14,15</sup> a recent review of the literature does not indicate any conclusive benefit overall.<sup>16</sup> However, a recent study<sup>17</sup> suggested benefit for patients with heart disease, and another,<sup>18</sup> the benefits of distal healing.

***The data demonstrate a 50%  
statistically significant pregnancy rate  
in the IP treatment group...***

There have been no studies, to our knowledge, on the application of IP to the treatment of infertility. Therefore, we carried out a prospective, randomized, double-blind study in which the efficacy of IP was assessed in patients undergoing treatment for IVF-ET who were unaware of the study. We chose the setting of IVF-ET in order to control for as many variables as possible and designed the study to be masked to patients, providers and investigators. In planning and conducting this trial in as rigorous a fashion as possible, we set out with the expectation that we would show no benefit of IP. None of the authors are employed by religious organizations, and we were not asked by any religious groups to conduct this trial, nor did we seek religious advice at any time.

### ***Materials and Methods***

#### ***Subjects***

Two hundred nineteen women aged 26–46 (mean, 33.9±4.7) with weight 41–72 kg (mean, 54.7±5.2) were prospectively but blindly enrolled into this randomized trial. These women were consecutively treated between December 1998 and March 1999. They were candidates for IVF-ET; we did not consider patients destined for tubal transfer (zygote or gamete intrafallopian transfer). These patients were being seen at the Cha General Hospital, Seoul, Korea. Twenty of the 219 cases had incomplete data available due to fragmentary E-mail transmission and were eliminated from further consideration prior to randomization. Patients beginning the cycles were ultimately stratified based on: (1) age, (2) length of infertility, (3) type of infertility, and (4) number (if any) of prior attempts (all cases considered unless tubal transfer was scheduled). They were then randomized into two equal groups (described below) to test the potential effects of IP. Patients and their providers did not know that they were participating in this study. Randomization and data transmission for IP or no IP (described below) were the responsibility of an independent statistician in Korea and another in the U.S. who was not affiliated with the authors. Randomization codes were made available only when all pregnancy data were available at completion of the study.

#### ***Protocol (IVF-ET and IP)***

All patients were treated with an identical protocol including the use of a GnRH agonist and gonadotropins (usually 3–75 IU ampules/d) until at least three follicles were mature. ET was carried out three days after retrieval.

The study examined the effect of a combination of directed and nondirected distant petitionary, or intercessory, prayer (IP) with patients undergoing IVF in a two-tier system. Petitionary or intercessory prayer is prayer participants' requesting God's intervention or assistance for the benefit of another individual.<sup>19</sup> Directed IP is praying for a specific outcome for an individual or individuals—i.e., prayers for conception.<sup>20</sup> All prayer participants in this study were of various Christian denominations. There were two tiers of prayer groups. Tiers 1 and 2 each consisted of four blocks of prayer participants (A–D). Most intercessors were known by one of the authors (D.P.W.), and others were referred by known intercessors. Within each block (A–D), intercessors knew each other. Prayer participants in tier 1 prayed in a directed manner with a specific intent to increase the pregnancy rate of the patients. Tier 2 prayer participants prayed in a directed manner for tier 1 prayer participants with the intent to increase their prayer efficacy.

IVF-ET patients were assigned to these prayer groups after randomization. For each treatment session, members of one prayer block in each tier randomly received a single sheet of paper with five IVF patients' pictures (a treatment unit) and were asked to pray for these patients. Prayer for a treatment unit

commenced within five days of initial hormone injection and continued for three weeks. Tier 1A participants prayed in a directed manner with the intent to increase the rate of pregnancy for each group of five patients, and tier 2A participants prayed in a directed manner for tier 1A prayer participants with the intent to increase the efficacy of prayer intervention and in a nondirected manner for the patients with the intent that God's will or desire be fulfilled in the life of the patient. The groups of four blocks with two tiers each were distributed in three countries, and each group was composed of 3–13 participants. In addition to the above, a separate group of three individuals prayed in a general, nonspecific manner with the intent that God's will or desire be fulfilled for the prayer participants in tiers 1 and 2.

Patient pictures and informational data, which are routinely obtained for all infertility patients, were collected at the Cha Medical Center during the trial dates by an independent statistician and transmitted to the United States via E-mail. E-mail was log-in and password protected, and the password was changed on a regular basis.

The pictures of treatment patients, for those patients randomized after stratification to IP, were pooled and divided into units of five pictures per unit. Five was an optimum number for this visual display. Each treatment unit of five pictures was digitally assembled onto one page and transmitted to the prayer participants via asynchronous facsimile transmission or express mail. Transmissions occurred electronically over secured systems and were sent only to prayer groups. No patient-identifying data (names, ages, etc.) were included. As stated above, prayer for a single treatment unit commenced within five days of initial hormone injection and continued for three weeks such that all patients randomized to IP had the intervention throughout the course of IVF-ET treatment.

#### *Assignment*

Patients were randomly divided after stratification of infertility status by computer allocation into treatment and control groups consisting of IP and no intercessory prayer (NIP), respectively. Figure 1 is the flow diagram of the randomized trial.

The experimental protocol for this study was approved by the internal review board of Cha General Hospital. Intercessory prayer was carried out in the United States, Canada and Australia without knowledge of the providers or patients.

#### *Masking*

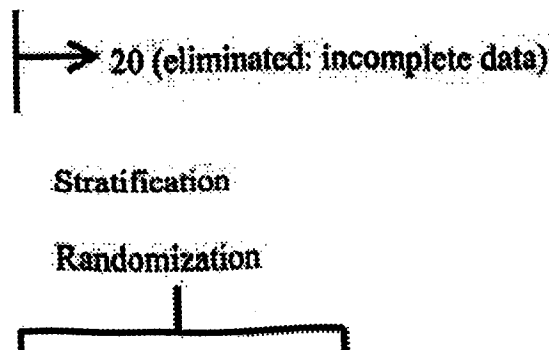
No patient was informed about this study. After the independent Korean statistician retrieved the data and transmitted it to the U.S. a second independent statistician in the U.S., randomized subjects and transmitted pictures to the prayer groups in different countries for subjects randomized to IP. The prayer groups had only pictures and did not have any patient information. Once pregnancy data were available for all the subjects over this trial period, these data were transmitted to the independent statistician in the U.S. to compile the results. The compiled results were then seen by the authors for the first time.

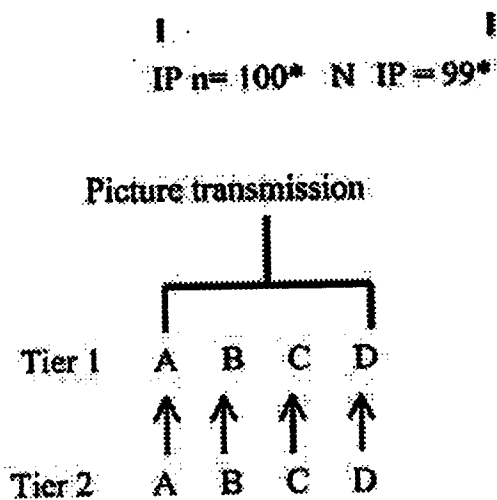
#### *Participant Flow and Follow-up*

After randomization, 16 patients had their cycles cancelled, and 14 cases did not result in ET. These 30 cases did not result in ET. Eighteen cases were eliminated from the NIP group and 12 from the IP group. The number of patients eliminated from each group was not statistically different. We therefore had 169 completed cases available for analysis (Figure 1).

219 women planning IVF-ET

December 1998 – March 1999





\*30 patients failed to complete the cycle:  
 16 cancellations; 14 with no ET  
 Pregnancy data available: IP n=88, NIP n=81

Figure 1 Flow chart of 219 women aged 26–46 planning IVF-ET randomized to IP vs. NIP. In groups of five, pictures of patients randomized to IP were sent to prayer groups in tiers 1 and 2.

No cases were eliminated after we had pregnancy data available for the 169 patients who had undergone IVF-ET. The 169 cases that had been randomized were divided into 88 having IP and 81 with NIP. Their ages, duration of infertility and number of prior attempts at IVF-ET were similar (Table I). Once pregnancy data were available, the study was completed. Patients were not informed about the study or results.

Profile	NIP	IP
No. of patients (ET cycle)	81 (81)	88 (88)
Mean (±SD) age (yr)	34.8±4.4	33.9±4.7
Duration of infertility (yr)	5.3±4.0	4.6±2.8
No. of oocytes retrieved	10.0±5.9	11.4±7.2
No. of oocytes fertilized	7.7±4.9	8.9±6.2
No. of oocytes transferred	4.3±1.4	4.3±1.2
No. of pregnancies/ET cycle (%)	21/81 (26)	44/88 (50)*

Values are mean ± SD.  
 \*P = 0031.

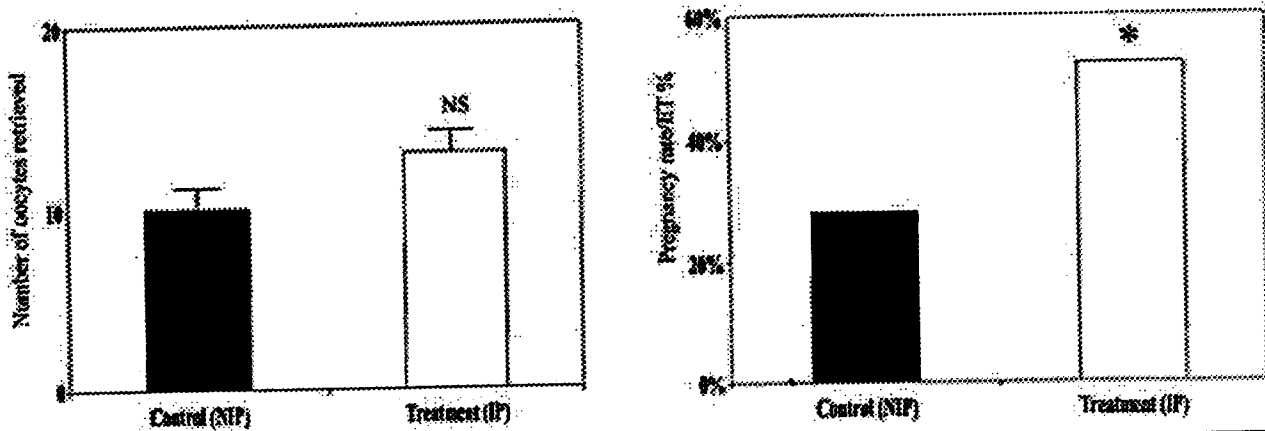
**Analysis**

All data were subjected to multiple comparisons in a log-linear model. The end point in this study was a clinical pregnancy defined by an intrauterine fetal pole with a heartbeat on ultrasound. Possible confounders were taken into account in a stepwise fashion, where we used a model of logistic regression. Data were analyzed using ANOVA and the least squares method. The sole outcome of the study was the pregnancy rate. No sample size could be projected because there have been no previous such studies.

**Results**

During their treatment cycles, the groups (IP and NIP) had similar numbers of oocytes retrieved (11.4±7 vs. 10.0±5.9) (Figure 2), numbers of oocytes fertilized (8.9±6 vs. 7.7±4.9) and preembryos transferred (4.3±1.2

vs.  $4.3 \pm 1.4$ ). The IP group, however, had a significantly higher pregnancy rate as compared to the controls (44/88, 50% vs. 21/81, 26%;  $P=.0013$ ) (Table I, Figure 2). After seven weeks of pregnancy there were three spontaneous losses in the NIP group and three in the IP group. All other pregnancies delivered at term, and obstetric outcomes were similar in the two groups. Adjusting for the pregnancy loss data, the term pregnancy rates were 22.2% in the NIP group and 46.6% in the IP group ( $P<.001$ ).



**Figure 2** Number of oocytes retrieved and percentage pregnancy rate per ET in the control (NIP) and treatment (IP) groups. NS=no significance in the number of oocytes retrieved in the two groups. \*Significantly higher pregnancy rate with IP ( $P<.0013$ ).

The following variables were assessed using logistic regression: age, duration of infertility, type of infertility and number of prior attempts. None of these variables affected the pregnancy rate. The adjusted odds ratio for pregnancy (IP vs. non-IP) was 3.3 (95% CL, 1.6–6.6).

Details of the number of oocytes retrieved are in Table II. The fertilization rates were similar, but the cleavage rate was higher in the IP group after adjustment for variables (73% vs. 69%,  $P<.0269$ ). The unadjusted cleavage rate was of borderline significance ( $P<.07$ ). The implantation rate was significantly higher in the IP group (16.3% vs. 8%,  $P=.0005$ ). The number of multiple pregnancies was also higher in the IP group (17% vs. 4.9%,  $P=.0126$ ).

Groups	No. of oocytes retrieved	No. of oocytes fertilized (%) <sup>a</sup>	No. of oocytes cleaved (%) <sup>a</sup>	No. of oocytes transferred (%) <sup>a</sup>	No. of preembryos implanted (%) <sup>a</sup>	Pregnancies/ET cycle (%)	Multiple pregnancies/ET cycle (%)
NIP	810	617 (76)	557 (69) <sup>a</sup>	352 (43) <sup>a</sup>	28 (8.0) <sup>a</sup>	21/81 (26) <sup>a</sup>	4/81 (4.9) <sup>a</sup>
IP	1,007	784 (78)	740 (73) <sup>a</sup>	380 (38) <sup>a</sup>	62 (16.3) <sup>a</sup>	44/88 (50) <sup>a</sup>	15/88 (17.0) <sup>a</sup>

<sup>a</sup>Percentage of oocytes retrieved.  
<sup>a</sup>Percentage of oocytes transferred.  
<sup>a</sup> $P<.0269$ , <sup>a</sup> $P<.0134$ , <sup>a</sup> $P<.0006$ , <sup>a</sup> $P<.0003$ , <sup>a</sup> $P<.0126$ .

The higher rate of pregnancies in the IP group was independent of the type of infertility. The rate in the tubal factor group was 26/51 (51%) for IP vs. 11/43 (26%) for NIP ( $P=.0125$ ); in the nontubal-factor group the rate was 18/37 (49%) vs. 10/38 (26%) ( $P=.0470$ ).

Patients in the two groups were analyzed according to various age groups: <30, 30–39 and >39. There was a consistent statistically higher pregnancy rate for IP in the 30–39-year group and in the >39-year group but not in the <30-year group. IP vs. NIP in the 30–39-year group was 51% (29/57) vs. 23% (14/62) ( $P=.0013$ ), 42% (5/12) vs. 23% (3/13) in the >39-year group and 53% (10/19) vs. 67% (4/6) in the <30-year group. We could not identify a difference in pregnancy rates in women <30, in whom the pregnancy rates were extremely high.

Consistent with the higher implantation rate in the IP group, a greater number of preembryos reached the eight-cell stage in the IP group (66% vs. 45.5%,  $P=.0001$ ). At the time of ET there were fewer preembryos at the five- to seven-cell stage in the IP group (14.5% vs. 28.6%,  $P=.0001$ ) and more seven- to eight-cell embryos in the IP group (69.2% vs. 49.6%,  $P=.0001$ ). Morphologic grading of embryos in the two groups did not differ significantly.

The overall pregnancy rate for IVF-ET during the study (December 1998–March 1999) was 38.5% when all pregnancies (both groups) were taken into account. This rate was similar to the historical rate for the center's program; the rate during the preceding months, January–November 1998, was 32.8%. Data were analyzed for each of the seven clinician providers who carried out procedures during the treatment period. The total pregnancy rates for the six providers were similar and ranged from 36% to 50%. One provider had only 18 cases and an 11% pregnancy rate. For each of the other six providers, the pregnancy rates for the IP group vs. NIP were 46% vs. 38%, 60% vs. 33%, 57% vs. 22%, 53% vs. 25%, 36% vs. 36% and 67% vs. 22%. The clinical protocols were all identical. The number of embryos transferred and the cleavage stages of the embryos were similar in the cases carried out by the seven providers. There were no changes in the schedules of the team of three embryologists, who all participated equally in the cases during this time, and there were no changes in the laboratory protocols or techniques or new batches of reagents or media used.

Because of known male factor, 41 of the 169 patients had intracytoplasmic sperm injection (ICSI) performed at the time of their cycles. The pregnancy rate in the two groups were not significantly different, IP 11/24 (46%) vs. NIP 9/17 (53%). Nevertheless, in the couples not receiving ICSI, the IP group had a higher pregnancy rate (33/64, 52% vs. 12/64, 19%;  $P=.0001$ ).

### Discussion

Several factors are known to either positively or negatively affect the success of IVF-ET procedures. The majority of physicians trained in allopathic medicine, however, would not consider prayer intervention to be one of them.<sup>21</sup> This was our view in designing this trial. The findings of this study suggest, however, that the inclusion of prayer intervention in the treatment protocol may provide a significant impact upon the success of IVF-ET in women over age 30. This is demonstrated by the IP treatment group, which exhibited statistically increased pregnancy rates for two categories of IVF patients who traditionally demonstrate decreased pregnancy rates, patients 30–39 years of age and those >39. Randomization took into account such variables such as type of infertility. The overall treatment success during the time of the study was in line with the current rates of the program.

The findings of this study are enhanced by the utilization of a methodologic design that eliminated belief, expectation and a placebo effect as confounding variables.<sup>22</sup> The fact that patients and clinician providers were unaware of the existence of the study and the investigators were also kept blind to treatment and control groupings ensured isolation of the treatment intervention. Further design restrictions ensured that prayer participants were from a different country and had no information about the IVF patients, thereby eliminating any confounding effect or bias.

The data suggest that the higher pregnancy rates in the IP group occurred as a result of increased implantation in that the oocyte yield and fertilization rates were comparable, as were the numbers of preembryos transferred. IP began early in the ovarian stimulation cycle, and there were no effects of it on the characteristics of the cycle. Because this experiment required a uterine ET, most patients who were candidates for this study had evidence of tubal disease. Although our data suggest an effect of IP on implantation, we cannot speculate further about a mechanism for this observation. We are highly cognizant of multiple unknown variables, which might affect pregnancy rates.

The only two groups who did not show any benefit from IP by subanalysis were couples undergoing ICSI and women <30. At least two possibilities may exist to explain this discrepancy: the smaller number of subjects in these groups and the high pregnancy rates. A minority of patients, 25, were under 30. Similarly, only 41 couples underwent ICSI procedures. In both these groups, the pregnancy rates were extremely high (56% overall in the <30-year group, 49% with ICSI). A much greater number of subjects would have been needed to show an effect if there was one. Further, in randomization of the 25 women <30 years in whom the pregnancy rates were similar, there were more women ( $n=19$ ) in the prayer group. Nevertheless, these pregnancy rates were extremely high and not statistically different. Age was not a confounding variable in these data.

The data demonstrate a 50% statistically significant pregnancy rate in the IP treatment group; it was well above the 26% pregnancy rate in the control group, which in turn was similar in the crude pregnancy rate for this IVF program during the time period. The 50% pregnancy rate is also statistically higher than the overall pregnancy rate in the program for the year before the trial period (32.8%). However, we view these data as preliminary. We are keenly aware of the multiple biologic factors and unknown variables inherent in the treatment process of IVF-ET.<sup>23,24</sup> Nevertheless, confidence in pursuing future work in this area is enhanced by the unique prospective, double-blind protocol utilized. Imperative to the integrity of this protocol was the design feature that ensured that patients and clinician providers were unaware of the details of the intervention.

Although this study was approved by the internal review board, in Korea, the fact that subjects were unaware of the intervention remains an area of controversy for future studies but was necessary in our view

to eliminate any bias. Additional factors, which need to be explored in subsequent studies, include religiosity and psychological profiles of the participants, the type and duration of IP, and the mechanisms explaining the purported benefit.

Our data suggest a benefit of IP on IVF-ET. However, we reiterate that we view these data to be preliminary and that they may not be confirmed in future investigations.

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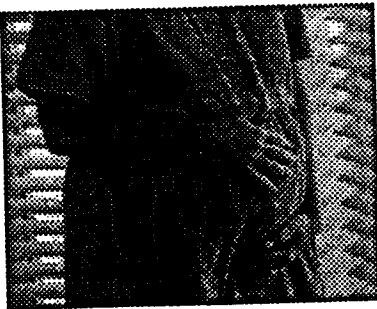
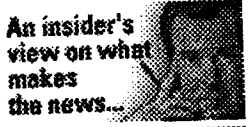
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A new study on the power of prayer over pregnancy reports surprising results. (PhotoDisc)

# Praying for Pregnancy

## New Study Finds Prayers Help Women Get Pregnant

Commentary  
By Dr. Tim Johnson  
abcNEWS.com

NEW YORK, Oct. 4 — This week, researchers at Columbia University and Cha Hospital of Korea have hesitantly stoked the fires of medicine, theology, and philosophy with an article reporting that women undergoing in vitro fertilization had higher rates of pregnancy when groups of strangers anonymously prayed for them.

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Indeed, it would be a truly wonderful and life-altering phenomenon if scientists discovered that prayer alone could help us bear children or cure disease. In fact, both self-prayer and the direct support of a religious community have been shown to improve health.

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Doctors and researchers speculate these religious factors influence mental and physical health by altering brain function, shifting hormone levels and boosting the immune system.

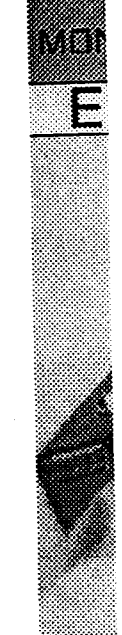
Most physicians however, remain skeptical of the curative powers of *anonymous* prayer.

### The Study

Researchers at Columbia University conducted the study with 199 women at an in vitro fertilization clinic in Korea. Unknown to the patients and their doctors, groups of strangers from the US, Canada, and Australia were asked to pray for their success in getting pregnant.

Pictures of patients in the test group were sent to the people praying when the women began hormone treatment and prayer continued for the next three weeks. No one knew which group was which until the three weeks was up.

The patients in the study were all undergoing in vitro fertilization, an assisted reproduction technique in which a man's sperm, and a woman's egg are combined in a laboratory dish, where fertilization occurs. The resulting embryo is then transferred to the uterus to develop naturally. According to the latest statistics from the American Society of Reproductive Medicine, the success rate of in vitro fertilization averages



Pers Fir

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22.8 percent live births per egg retrieval.

To the surprise of the researchers, the women who were prayed for ended up with a significantly higher pregnancy rate than those who were not prayed for. "About 50 percent got pregnant in the prayer group and about 26 percent in the non-prayer group," the lead author of the report, Dr. Roger A. Lobo, Columbia's chairman of obstetrics and gynecology said on *Good Morning America*. The study appears in the current *Journal of Reproductive Medicine*.



### Surprise and Skepticism

Lobo and his colleagues initially questioned whether to publish their findings, since the results seemed so unlikely. Yet the findings were so statistically overpowering, the research team decided to share them, said Lobo. He said the researchers tackled the study out of curiosity, and because it had not been done before.

And even though the study was carefully thought out, conducted, and analyzed, even Lobo remains skeptical of the results and agrees that more work in this area needs to be done. For example, additional factors such as the religiosity and psychological profiles of the study participants should next be explored.

It's important to point out that in every scientific study there is a statistical margin of error, usually quite small, that the results occurred purely by chance, rather than by cause. So research findings are always considered preliminary until the same results are repeatedly found by different researchers with different groups of subjects.

In addition, becoming pregnant involves numerous biological, psychological, and perhaps even spiritual factors that we don't fully understand. And, despite our best abilities, we can never fully control all the variables that might influence the outcome of a study.

And finally, the potential psychological ramifications are worrisome. From the results of this study, some people may feel that if they cannot get pregnant or are not healed of their illness that it is because they did not have enough faith, or didn't get enough people to pray for them.

This study is one of many that have been done on religion and medicine, and while the results are statistically significant, the benefits of prayer have by no means been conclusively proven. ■

— *Dr. Timothy Johnson is ABCNEWS' medical editor and a medical doctor who also serves as assisting minister of the Community Covenant Church in West Peabody, Mass.*

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**the SKEPTIC'S  
DICTIONARY**

Robert Todd Carroll

## Mass Media Bunk

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### Skeptic's Refuge

Mass Media Bunk features news stories or articles in the mass media that provide false, misleading or deceptive information regarding scientific matters or alleged paranormal or supernatural events.

**Note: because many of the sites linked to here are newspapers or magazines, it is impossible to maintain the links.**

**October 4, 2001.** Last month, the *Journal of Reproductive Medicine Online* (vol 46. no. 9, September 2001) featured an article called "Does Prayer Influence the Success of in Vitro Fertilization—Embryo Transfer? Report of a Masked, Randomized Trial" by Kwang Y. Cha, M.D., Daniel P. Wirth, J.D., M.S., and Rogerio A. Lobo, M.D. The answer, say the authors, is "yes, quite a bit." For example, "The IP [intercessory prayer] group had a higher pregnancy rate as compared to the no-IP rate (50% vs. 26%, P=.0013)." The story has been in the news lately, in newspapers, on television, and, on the Internet where one can find a fair and reasonable account by Dr. Tim Johnson for ABCnews.com of something that shouldn't be science much less news. We expect this kind of stuff from the "alternative" health/energy medicine folks, but not from "real" scientists.

I don't question that the researchers were able to establish a "statistically significant difference" between the IP and no-IP groups. The researchers went to quite a bit of trouble to do their controlled, double-blind experiment. They even had the one's doing the praying in a different country from those getting the in vitro fertilization. One thing they didn't do, however, was define "prayer" or explain how it might influence anything in the universe, much less the outcome of their little experiment. Nor did they address an even more serious issue. If prayer works by influencing God to influence the outcome of an experiment, then God can interfere with the laws of nature at any time. If God can interfere with the laws of nature at any time, then no controlled, double-blind study can be sure of the meaning of whatever outcome results. Any result could be the result of direct influence by God. In other words, the assumption the study is based on is self-defeating. No science at all would be possible if God could be interfering with the laws of nature at will. Science requires a backdrop of lawfulness in Nature in order to discover any causal connection between anything and anything else.

I'm sure other devoted scientists will try to duplicate this experiment. When they do, I suggest that they try a couple of things. One, I suggest they do the same experiment, except that nobody prays for anybody. Pretend that one group had prayers said for them and call that group the IP group. Compare it to the other group, which we can call the no-IP group even though both groups are no-IP. Do this five or six times to see if you can get a statistically significant difference between the two groups. You shouldn't, of course. But if you do, that would weaken the probability that there was no methodological, procedural or mathematical error in the first

study.

I would also do a few studies where one Korean group, instead of being prayed for, would be arbitrarily associated with a group of American people who point their butts towards the East at dawn and say "yabba dabba doo doo." We can call the group associated with this irrational activity the YDDD group. Compare them to the no-YDDD group. There should be no statistically significant difference between the groups if there is no causal relationship between dawnbutting in America and pregnancy in Korea. If we find statistically significant differences when we do not expect to we can conclude that God interfered with the normal course of nature. We probably should conclude something else; for example, we might conclude that sometimes statistically significant differences are not indicative of causal connections but should be expected to occur occasionally even when there is no causal event. Or we might conclude that some sort of error has occurred in our methodology or calculations.

On the other hand, we suggest that instead of wasting everyone's time on this kind of non-sense, even if the non-sense is dressed up in clean white coats and replete with scientific and statistical jargon, we do some meaningful research like that reported in a recent issue of *Nature* regarding a gene that has been identified as being responsible for a specific human language disorder. Something useful might actually come of such research, but nothing of use will come of studies trying to see if strangers praying for strangers can help them get pregnant.

What has happened to scientific research when magical thinking is considered within the bounds of reasonable empirical study?  
[thanks to Karl Jennings]

#### further reading

- [Mass Media Bunk #10](#)
- [Mass Media Bunk #11](#)
- [Mass Media Bunk #13](#)
- [Mass Media Funk #14](#)
- [Mass Media Funk #17](#)
- [God in the CCU? A critique of the San Francisco hospital study on intercessory prayer and healing Gary P. Posner, M.D.](#)
- [Studies on Prayer and Healing Flawed - Infidels.org](#)

October 4, 2001. [Salon.com](#) senior writer Janelle Brown's "Mystery Cure" is little more than a puff piece for Francine Shapiro's allegedly miraculous