

Evaluation of Transtheoretical Model-Based Family Education Among Females of Zahedan (Southeast of Iran)

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Background: It cannot be denied that many improvements in female and child health have been achieved worldwide through international family planning programs. More than half of the females (57%) with unintended pregnancy admitted that they had not used birth control the month before conception.

Objectives: The aim of this study was to promote family planning practice among females of Zahedan (southeast of Iran) through the transtheoretical model (TTM).

Patients and Methods: The current quasi-experimental study was conducted on 96 eligible females, who were allocated either to the case or the control group and were selected from homes in the border of Zahedan city (southeast of Iran) during 2010. Convenience sampling by door-to-door visits was used for finding eligible cases. A TTM-based self-administrated family planning questionnaire was used for data collection. Participants in the intervention group received education in two groups, based on their stage of change: precontemplation, contemplation, preparation, action, maintenance, and all groups were followed for three months.

Results: The result of the chi-square test did not show any significant difference in the stage of change: precontemplation, contemplation, preparation, action, maintenance before education between the control and intervention groups ($P = 0.55$). After education, subjects in the intervention group moved forward through stage of change and got at least one step closer to the family planning behavior, with this change being significant ($P < 0.001$), while the movement of participants through stage of change not being significant in control group ($P = 1$). The results of statistical tests illustrated that the mean knowledge of the intervention group was 7.5 ± 7.1 versus 0.5 ± 4 for the control group ($P < 0.001$), mean of attitude of the intervention group was 5.5 ± 5.41 versus 0.09 ± 2.04 for the control group ($P < 0.001$), and practicing family planning methods ($P < 0.007$) in the intervention group was higher than the control group after education based on TTM.

Conclusions: According to this study, the educational plan based on TTM was effective in changing knowledge, attitude, and practice and directing females towards taking action. Moreover, self-efficacy, perceived barriers and benefits are factors that affect the use of family planning methods.

Keywords: Health Education; Contraceptive Devices; Family

1. Background

The health of mothers and children has improved throughout the world due to the undeniable effect of family planning programs (1). Previous studies have shown that more than half (57%) of the females with unwanted pregnancies did not use any birth control method (2). According to statistics, the percentage of married women aged 15 to 49 years, who did not use any birth control methods and did not want to have children, was 5.9% in Iran and 12.9% in the city of Zahedan (Southeast of Iran), in 2001 (3). According to the 2007 statistics of the world health organization (WHO), approximately 255 women in 100 000 die due to childbirth complica-

tions, and 99% of these deaths take place in developing countries every year (4); this rate was 24.7 in 100,000 live births in Iran (3).

According to the WHO, family planning allows individuals and couples to anticipate and attain their desired number of children and the spacing and timing of their births (5). Nowadays, with due attention to the 10% increase in the usage of family planning methods in developing countries compared to the 1960s, 25% - 50% of females still announce their last pregnancies as unwanted. The study of integrated monitoring evaluation system survey (IMES) in 2005 showed that the rate of un-

wanted pregnancy was 18.6% in Iran and 19.5% in the city of Zahedan (3). Factors such as ineffective methods, non-contiguous usage, lack of understanding as to how to use the methods, low level of information, side effects or fear from them, not being able to negotiate about choosing the prevention method with one's spouse, insufficient understanding of the dangers of pregnancy, no accessibility to birth control services, and the influence of the spouse and friends have been mentioned, which show the need for sufficient education about birth control methods at the public level (6-11).

The most important principle of family planning is to accept and use prevention methods in an arbitrary and intentional way. The suggested approach is to enhance knowledge with the objective of changing one's attitude and creating motive, and ultimately changing practice in the field of family planning objectives. In this regard, education is very effective (12). New educational approaches have shown that theories and models for designing interventions enhance the perception of health behaviors, determine the direction of change and facilitate the employment of programs in different situations (13). Kirby's general assessment (14) about educational programs on human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) and sexual relations also showed that programs with a theory-based approach were the center of positive effects in exploiting family planning methods in teenagers.

Amongst the methods of health education, the trans-theoretical model (TTM) was employed in this study because of its unique quality in using special prerequisites at each stage of change. This is one of the models that have been used successfully in family planning programs in the world. In a study by Ha et al. (15) in Vietnam, this model was used to assess the effect of education on the intra-uterine device (IUD) for men; this study confirmed that prerequisites of this model could be effective on the rate of IUD use. In another study, Hacker et al. (16) used this model to control and prevent pregnancy and HIV/AIDS and the results showed the effectiveness of this model.

The stages of change of this model was designed by Velicer et al. (17) and the first construct of this model is the stage of change, which includes: 1) pre contemplation (the person does not reflect upon change of behavior in a predictable future) 2) contemplation (the person thinks about change in a predictable future, which is defined between one to six months) 3) preparation (the person plans for change in the near future, which is usually defined in the future month) 4) action (the person has been committed to change in the past six months) 5) maintenance (the person is committed to change for six months or more). According to this model, the person can pass from one stage to the next or skip one to the next or even go back to a previous stage. The second construct of the model is steady decisional balance. According to this construct, the person, when deciding to change, starts to analyze and consider the pros and cons of the change.

Another construct of this model is self-efficacy which, according to Bandura, is based upon the person's belief in his own abilities to organize and use practicable sources for the situations ahead (17, 18). Peiman et al. (19) used the stages of change model in a put together way with a self-efficacy construct for the correct engagement of people in using oral contraceptive pills (OCP) and the results showed that the constructs of this model along with perceived self-efficacy were a good predictor for the correct usage of OCP.

On the other hand, one has to keep in mind that if there is recognition of influential factors, on health behaviors of people, in building strategies and ways that make possible the goals for health education, a better situation is established, and the factors for success will be chosen in a more reasonable way (20). Therefore, a proper program based on the models of behavioral change can aid us reach educational goals. On the other hand, the results of different studies are indicators of different models for using birth control methods, showing the importance of the accordance of programs and educations with each area's culture (21), beliefs and social-economic status (22). Therefore, with due attention to the social-cultural situation of the city of Zahedan, we decided to perform a study using the stages of change model on females because they, in addition to having a prominent role in family planning programs, have an important role in attracting the participation of their spouses (9).

2. Objectives

The current study aimed to determine the effectiveness of a family planning educational intervention based on TTM amongst females of Zahedan (southeast of Iran).

3. Patients and Methods

3.1. Study Design and Participants

The present study consisted of two groups and was a quasi-experimental (interventional) research. Data were collected during the year 2010, from two governmental, non-referral health care centers of two areas on the border of the city of Zahedan, which were almost similar in sociocultural characteristics. Inclusion criteria were age between 15 and 49 years, being fertile, not being pregnant, and living with the spouse. Exclusion criteria were divorced and no intent for childbirth.

From the viewpoint of readiness based on the stages of change construct, the females in both groups were at the stages of pre-contemplation, contemplation, preparation, action and maintenance; participants in these two groups had an equal distribution.

3.2. Questionnaires

The data collection tool was a TTM based self-administered questionnaire, which was prepared from informa-

tion provided in the literature and textbooks, and the results of other studies in this field. For confirming the content validity, the questionnaire was reviewed by ten experts in different fields such as family planning, health education and midwifery. The reliability of the questionnaire was then evaluated using internal consistency with Cronbach's alpha. Cranach's alpha for reliability was 0.66. The final questionnaire consisted of eight sections: demographic information, knowledge, attitude, practice, preparation stages, perceived barriers, perceived benefits, and self-efficacy. In addition, a behavioral checklist including the number of visits to the health care centers and the birth control method, during the three months of follow-up, was completed by health care staff. For the knowledge section (26 items), a correct answer received one score, and an incorrect answer or "I don't know" scored zero. For attitude (eight items), perceived self-efficacy (five items) and perceived benefits (five items), a negative answer received one score, "I don't have any idea" received two scores, and a positive answer received three scores, while scoring for perceived barriers (four items) was the opposite. Regarding practice (ten items), never, rarely, most of the time, and always scored 0.25, 0.5, 0.75, and one, respectively. Non-probability sampling or convenience sampling was used by door-to-door visits (in the vicinity of the health care centers) and finding eligible cases, who were covered by the two health care centers. More than 250 houses within the two areas were visited and females were asked for their suitability and tendency to participate in the survey. Due to the possibility of sample loss, the first 110 females were registered. Also, simple random allocation was used. The sample size with 95% confidence interval, test power of 80%, p_1 of 50% (9) and p_2 of 66% was calculated as 44 individuals. In total, 44 individuals participated in the intervention group and 52 individuals in the control group.

3.3. Ethics

The Helsinki codes were considered in this study. This study received approval from the ethics committee of Zahedan University of Medical Sciences with project number: 1088, February 2009. All participants gave their oral consents for participation in this research. All information of the participants was kept confidential and they were allowed to discontinue participation at any stage of the research. Time and date of the classes were set with their time. For the education sessions, the intervention group was divided to two sub-groups, the first group included participants at the pre-contemplation, contemplation and preparation stages and the second group included participants at the action and maintenance stages. Therefore, participants in first group did not use any birth control methods. Education meetings were held as follows: participants in the first group attended two, two-hour sessions and participants in the second group took part in one two-hour session of educa-

tion on the principles and correct use of family planning methods. The educational approach for the first group insisted upon the effects of using birth control methods on the health of the mother and the child in addition to population increase and quality of life. The use of birth control methods was encouraged through increasing the sensitivity of the participants, emphasizing on perceived benefits and self-efficacy, reducing perceived barriers, modification of their misconception using simple and palpable examples and re-reading the judgments of Molavi (the clergyman of Sunni people) related to family planning. Education methods such as lectures, face-to-face discussions, questions and answers, group discussions, flip charts, etc. were used. After 45 days, a pamphlet on modern family planning methods was handed out to all intervention group participants. The effect of the education was evaluated through a questionnaire and a behavioral checklist three months after the end of the educational intervention.

3.4. Analysis

The SPSS software version 16.0 (SPSS, Chicago, IL, USA) was used for analysis. The data was analyzed with the Chi-square test, Wilcoxon t-test, paired t-test, McNemar's test, and Mann-Whitney U test.

4. Results

The mean age of the participants was 29.3 ± 5.7 . The majority (48.9%) of the subjects in both groups were aged between 21 and 30 years. About 61.7% of the females were uneducated or had elementary school education and 55.3% were Sunni. Table 1 shows demographic characteristics and comparison of them between two groups.

According to Table 2, t-test and Mann-Whitney U showed no significant difference in knowledge, attitude, self-efficacy, behavior and perceived barriers between the intervention and control groups, although a significant difference was seen in perceived benefits in the intervention and control groups before the educational intervention ($P = 0.01$). Also, chi-square test did not show any significant differences in the preparation phases of the intervention group and the control group before education ($P = 0.55$). Table 3 shows the t-test, paired t-test and McNemar's test results indicating the mean scores of knowledge, attitude, behavior, and the construct of the stages of change in both groups before and after the intervention.

The percentage of individuals using family planning methods increased from 43.2% before the intervention to 77.3% after the intervention, in the intervention group, and from 38.5% to 40.4% in the control group, respectively. Because of the yes or no format of the answers, in order to analyze before and after nominal variables, McNemar's test was chosen, which showed that the difference was significant in the intervention group (median = 0.77, inter quartile range (IQR) = 0, $P < 0.001$), yet insignificant in the control group (median = 0.46, IQR = 1, $P = 1$).

Table 1. Comparison of Demographic Variables in the Control and Intervention Groups^a

| Demographic Variables | Intervention Group | Control Group | P Value ^b |
|--|--------------------|---------------|----------------------|
| People aged 21 to 30 years | 22 (50) | 24 (46.2) | 0.17 |
| Illiterate and primary school | 29 (65.9) | 29 (55.7) | 0.07 |
| Housewife | 41 (93.2) | 44 (86.5) | 0.25 |
| Having less than four children | 28 (63.6) | 39 (75) | 0.092 |
| Getting married between 11 to 18 years | 37 (84.1) | 32 (61.5) | 0.011 |

^a Values are presented as No. (%).^b General comparison between demographic variables in control and intervention groups.**Table 2.** Comparison of Different Variables at Baseline^a

| Variables | Values | P Value |
|---------------------------|-------------|---------|
| Knowledge | | 0.77 |
| Intervention group | 9.6 ± 5.7 | |
| Control group | 9.2 ± 0.92 | |
| Attitude | | 0.83 |
| Intervention group | 13.9 ± 3.9 | |
| Control group | 15.1 ± 0.4 | |
| Practice | | 0.73 |
| Intervention group | 3.3 ± 1.9 | |
| Control group | 3.1 ± 0.2 | |
| Behavior, % | | 0.77 |
| Intervention group | 43.2 | |
| Control group | 38.5 | |
| Perceived barriers | | 0.82 |
| Intervention group | 8.45 ± 2.4 | |
| Control group | 7.5 ± 0.33 | |
| Perceived benefits | | 0.016 |
| Intervention group | 14.4 ± 1.2 | |
| Control group | 13.7 ± 0.19 | |
| Self efficacy | | 0.35 |
| Intervention group | 13.6 ± 1.7 | |
| Control group | 13.2 ± 0.32 | |

^a Values are presented as % or mean ± SD.**Table 3.** The Mean Scores of Variables Before and After Education in the Control and Intervention Groups

| Variables Groups | Knowledge | Attitude | Practice ^a | Behavior, % ^b | Perceived Barriers | Perceived Benefits | Self-Efficacy |
|---------------------|------------|------------|-----------------------|--------------------------|--------------------|--------------------|---------------|
| Intervention | | | | | | | |
| Before | 9.6 ± 5.7 | 13.9 ± 3.9 | 3.3 ± 1.9 | 43.2 | 8.45 ± 2.4 | 14.4 ± 1.2 | 13.6 ± 1.7 |
| After | 17.1 ± 3.5 | 19.5 ± 3.7 | 4.8 ± 1.1 | 77.3 | 9.8 ± 2.1 | 14.6 ± 0.88 | 14.4 ± 1.2 |
| P values | < 0.001 | < 0.001 | < 0.001 | < 0.001 | 0.005 | 0.195 | 0.005 |
| Control | | | | | | | |
| Before | 9.2 ± 0.92 | 15.1 ± 0.4 | 3.1 ± 0.2 | 38.5 | 7.5 ± 0.33 | 13.7 ± 0.19 | 13.2 ± 0.32 |
| After | 8.7 ± 0.8 | 15.1 ± 0.4 | 4.2 ± 0.15 | 40.4 | 7.7 ± 0.35 | 13.9 ± 0.18 | 13.6 ± 0.3 |
| P values | 0.39 | 0.7 | < 0.001 | 1 | 0.51 | 0.25 | 0.18 |

^a Any activity related to family planning such as persuading their spouse Etc.^b Only using family planning devices.

Table 4 shows the method used by subjects after education in the intervention group, indicating that the most frequently used modern birth control method in this study after the education was the Oral Contraceptive Pill (OCP).

Also, the mean of changes in knowledge, attitude (t-test) and behavior (Chi square test) in intervention group were significantly higher than control group (Table 5).

According to Table 6, out of 24 in intervention group who were in pre-contemplation, contemplation and preparation stages of change, twelve reached to action and maintenance stages of change after education pro-

gram, yet there was no change in the control group.

Because the considered variable (stage of change) was qualitative and the number of people at each stage was a few thus using nonparametric analysis seemed to be essential. The results according to the Wilcoxon test showed that the participants' development through stages of change was significant in the intervention group (median = 3.84, IQR = 1.5, $P < 0.001$), and insignificant in the control group (median = 3.17, IQR = 4, $P = 7$). Also, the Mann-Whitney U test showed that the rate of changes in the stages of change in the control and intervention groups was not significant before ($P = 0.7$) and after ($P = 0.105$) the intervention yet.

Table 4. The Frequency of Used Birth Control Method in the Intervention Group After Education ^{a,b}

| Prevention Method | Intervention Group | |
|-------------------|---------------------|--------------------|
| | Before Intervention | After Intervention |
| IUD | 2 (4.5) | 3 (6.5) |
| LD pills | 12 (27.5) | 20 (45.5) |
| Norplant Jadelle | 1 (2.3) | 1 (2.3) |
| Withdrawal | 11 (25) | 4 (9.1) |
| DMPA | 5 (11.4) | 7 (15.9) |
| Condom | - | 3 (6.8) |

^a Abbreviations: DMPA, depot medroxyprogesterone acetate; and IUD, intrauterine device.

^b Values are presented as No. (%).

Table 5. Knowledge, Attitude, Behavior, and Practice Changes in the Control and Intervention Groups After the Education

| Amount of Change | Mean of Change | | P Value |
|--|---------------------------|---------------------------|---------|
| | Intervention Group | Control Group | |
| Knowledge | -7.5 ± 7.1 | 0.5 ± 4.1 | < 0.001 |
| Attitude | -5.5 ± 5.4 | 0.09 ± 2.04 | < 0.001 |
| Practice | -1.5 ± 1.98 | -1.09 ± 1.12 | 0.205 |
| Behavior (using family planning methods) | df = 1, $\chi^2 = 26.924$ | df = 1, $\chi^2 = 26.924$ | < 0.007 |

Table 6. Changes in Preparation Phases Before and After Education in the Control and Intervention Groups

| Main Group Subheading | Participants in Pre-Contemplation, Contemplation and Preparation Stages of Change ^a | Participants in Action and Maintenance Stages of Change ^a | P Value |
|---------------------------|--|--|---------|
| Intervention group | | | < 0.001 |
| Before education | 24 | 20 | |
| After education | 12 | 32 | |
| Control group | | | 0.7 |
| Before education | 28 | 28 | |
| After education | 24 | 24 | |

^a The unit of the data is the number of people.

5. Discussion

The purpose of this study was to evaluate the stages of change model in using modern birth control methods. In this study, the scores of knowledge, attitude, and practice before and after the intervention in both groups changed significantly.

These findings could have resulted from an education program based on the stages of change and the discussion method that provided an opportunity for venting feelings. In a systematic review by Lopez, in two of ten trials with pregnancy or birth data, a group who participated in theory-based education showed better results for using contraceptives (23). Similar to our findings, a study performed by Hosein Zadeh et al. (24) in Chabahar (a port city of Iran) showed that female's knowledge, attitude and practice increased after education. In a study conducted by Ha et al. (15), the percentage of the participants in the intervention group who reached the action and maintenance phases increased significantly. However, in the present study, the participants' performance increased in both groups. The performance increase in the control group could be due to the type of questions in the practice section that contained behavior-related questions on methods like discussion and debate with the spouse about using prevention methods, and also the effect of completing the questionnaire.

In a study by Ha et al. (15), people moved forward in the stages of change in the intervention group after the intervention, while they almost maintained their stages in the control group. These results are similar to our study, which showed that a greater number of participants in the intervention group moved towards behavior changes when compared to the subjects in the control group.

Regarding the model constructs in the stages of change, the participants' perceived barriers decreased after intervention in the intervention group, which can be due to reforming misconceptions about modern birth control methods. Velicer et al. (25) also showed that increasing knowledge and reforming misconception on the side-effects of birth control methods when combined with consultation can be useful in moving from pre-contemplation to function and maintenance. The results of various studies have shown that consultation about pregnancy prevention is more than giving information to or answering the questions of people looking for help, and the health care professionals need to discover and reform their beliefs and attitudes towards this matter; which can be facilitated by this model and education (22).

A study in USA, which employed this model to use the dual prevention method, found that the most important birth control method to avoid unwanted pregnancy was reformation of the application mode (26). In a systematic review in 2013, it was concluded that family planning needed better ways to help females choose an appropriate contraceptive and continue using that chosen method (27). Similarly, in the other studies after the intervention,

people realized fewer perceived barriers than the control group (15, 28). In the present study, perceived benefits of using birth control methods were high before the intervention in both groups, which could be due to economic problems, extensive advertisements about family planning in previous decades, or the participants' tendency to give positive answers to the questions in the questionnaire. Nonetheless, the reason why these high perceived benefits did not result in the intended behavior in some people could be the religious subjective norms (religious leaders) or the pressure of the spouse. However, in the study by Ha et al. (15), perceived benefits of family planning general behaviors did not show any increase during phase changes towards function; in contrast, in the study performed by Grimley et al. (28), the higher the people's perceived benefits were, the more they improved in using condoms. Studies have shown that perceived benefits and barriers and self-efficacy about birth control methods are different in each phase of the stages of change (29-31); Glanz et al. (32) specially suggested that in the basic phases, perceived benefits should be more than their barriers. Self-efficacy increased in the intervention group after education. In a study performed on rural African-Americans by Gullette et al. (33), it was shown that females had more self-efficacy than males in using condoms (22).

In the other study, a strong relationship was observed between self-efficacy, health behavior change, and the maintenance phase (34). In this study, after education, females in the intervention group had considerable improvement in the stages of change and reached further phases. This supports the fact that the designed method according to the stages of change model is effective for using birth control methods. In a study conducted by Chambers et al. entitled "safer decision in teenage women", the stages of change model was found as an elevating scope for people's understanding for making more certain decisions (35).

According to the results of this study, knowledge, attitude, and practice of the participants in the intervention group, who were mostly uneducated, increased after intervention using the stages of change model, which indicates that we should use models to transform theory into action to change people's attitudes in order to achieve development purposes easier. Therefore, to achieve these purposes, we should clarify misconceptions and teach correct ways of using birth control methods, especially in areas with less education and lower socioeconomic levels.

Although these data and analyses are useful in practice especially because the intervention group was divided to two groups according to the participant's stage of change, they have some limitations including the cross sectional nature of the study, and the long follow-up period required for obtaining accurate information. On the other hand, the process of change, which is another TTM construct, was not addressed, and could be investigated

by further studies. Also, in future studies, different interventions according to the participants' stage of change should be considered. Since 50% of decision makers in the area of family planning and prevention methods are males, it is suggested that we plan some programs for more participation of males through using health promotion models, and involving clerics in this area. Moreover, it is recommended to investigate Molavis' (Sunni people's clergyman) attitudes toward family planning to increase the use of these methods by females.

In conclusion, the Transtheoretical Model could increase contraceptive knowledge, attitude, and behavior; moreover, self-efficacy, perceived barriers and benefits are factors that affect the use of family planning methods. However, to maintain these results, health care centers and mass media need to repeat these educations in order to stabilize them. On the other hand, since perceived benefits and barriers changed less after the intervention, some novel ways and policies should be employed to encourage females, to increase perceived benefits and decrease barriers. Anderson recommends projection and group discussions to decrease perceived barriers and watching movies and discussions to increase perceived benefits. He also suggests role play and stress lowering techniques to promote self-efficacy (36). Thus, these suggestions should be considered in educational planning.

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Authors' Contributions

Tahereh Kamalikhah organized and taught the intervention program. Fatemeh Rakhshani was the supervisor of this project. Fatemeh Rahmati Najarkolaei and Mehdi Gholian Avval helped the authors prepare the manuscript.

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