



Prevalence of Sexual Transmitted Infections (STIs) and Un-Protected Sex in Temporary Marriage in Iran: A Systematic Review and Meta-Analysis

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Abstract

Background: Temporary marriage (TM) is legitimate sexual relations without social, moral approval, which can be a threat to individuals' health, it is a risk factor for spread of Sexual Transmitted Infections (STIs). Therefore, it is necessary to identify and control STIs in TM-individuals and subsequent save of "society health". In this meat-analysis, we examined the prevalence of STIs in TM in Iran. We further examined un-protected sex among TM-individuals.

Method: Up to Feb 2020, we searched international and national electronic databases identify to published studies on the prevalence of STIs in TM. We estimated the prevalence of STIs in TM using a random-effect pooled estimate analysis approach.

Results: Totally, we retrieved 1616 studies from the previously mentioned databases, of which, 18 met the eligibility criteria, published from 1995 to 2020 in different provinces. The total sample size of the included studied contained 2056 TM-individuals, of which 368 were found with STIs and 955 with unprotected sex. The pooled prevalence of STIs and unprotected sex among TM women was 39% (95%CI: 24% to 54%), 55% (95%CI: 40% to 70%)

Conclusion: STI and unprotected sex are high among TM-individuals which call an urgent need for community and health care providers to provide especially designed medical and psycho-social supportive care services in a safe and unprejudiced environment for TM-individuals. Furthermore, untrained health care providers for TM-individuals, under reporting, social stigma should be taken in to account. Denying the presence of such realities, does not eradicate the facts but results in catastrophic public health problems.

Keywords: Prevalence; Sexual transmitted disease; Unsafe sex; Temporary marriage

Introduction

Temporary marriage (TM) is a kind of marriages, in which man and woman engage for a certain period of time and with a certain dowry (1). TM

(Muta'a), legitimate among the Shiia Muslims in Lebanon, Iraq, and Iran. TM is official in Iranian civil law (Principles:1075,1095-98). There are no



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accurate statistics on TM in the country due to the secrecy and privacy of the issue (2,3). However, unofficial sources report that the number of TM has been on the increase (4). TM and Other Non-Conventional Marriages are common in Iran and Middle East region. According to the previous studies in the Extended Middle East and North Africa (EMENA) region is experiencing dynamic economic, political, and socio-sexual changes that have an impact on all echelons of life, especially youth Sexual and Reproductive Health (SRH) and their marriages (5–7). Unique issues in this region such as TM, because of absence of quality resources and services in reproductive and sexual health, under reporting, poor notification due to social stigma, are additional STI risk factors, affecting prevention programs and treatment strategies. It's essential to establish SRH policies promote STIs counseling especially in countries with temporary marriage for example Iran and Lebanon (8–11).

To the best of our knowledge, no pooled estimate on the prevalence of TM in Iran is published so far. The aim of this study was to provide valid estimates on the prevalence of TM, un-protected sex and STIs in different provinces of Iran by conducting a meta-analysis. Robust findings on this topic reveals the urgent need for well-defined sexual and reproductive supportive care programs for this vulnerable group.

Methods

Protocol and registration

The present systematic-review and meta-analysis was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement (12). The protocol of this study was registered in the International Prospective Register of Systematic Reviews (PROSPERO: CRD42020189426).

Search strategy and study selection criteria

A comprehensive search was performed with the aim of finding any cross-sectional or case-control or cohort studies that investigated the prevalence

of temporary marriage. Accordingly, the following sources were searched: Web of Science, Scopus, PubMed, Science Direct, Google Scholar, Magiran, Scientific Information Database (SID), IranMedex, and Medlib. Four sets of related MeSH and non-MeSH terms in titles, abstracts, or keywords were used: (“temporary marriage” OR “Sigheh” OR “Mut’a” OR “short form marriage”) AND [(“Sexually Transmitted Disease*” OR “Sexual Transmitted Infection*” OR “Venereal Disease” OR STDs OR STIs) OR (“Unsafe Sex” OR “Unprotected Sex” OR Condomless Sex OR “Un-Protected Intercourse” OR “High Risk Sex”)] were searched for articles published up to May 2020. The search strategy was performed using Boolean operators (AND, OR). We also manually reviewed the reference lists of related articles for other possibly relevant articles not found through the electronic search strategy.

Inclusion and exclusion criteria

We included prospective cohorts and case-control and cross-sectional studies that investigated the prevalence of temporary marriage. Prospective cohort, case-control and cross-sectional studies that did not report the prevalence our interested incomes, reported the prevalence of outcomes among sub-sample of total population (not relevant or modified data), review studies, qualitative study, editorials, letters to the editors, commentaries, expert opinions, case series, case studies, brief reports, and book chapters were not included in the present systematic review and meta-analysis, duplicate publications, two or more studies using the same sample

Data extraction

Two independent authors extracted the following characteristics from the included studies: author's name, year of publication, study state/province, study sample size, the number of temporary marriage individuals, the prevalence un-protected sex, the prevalence STI, and study design. Any disagreement between the two reviewers was resolved through discussion with the senior author.

Quality assessment

A standard eight-item checklist for the critical appraisal of studies of the prevalence/incidence of health problems (13) was used to examine the quality of the included studies by two independent investigators. This tool defines 8 criteria including: 1) if a random sample or whole population was examined, 2) if an unbiased sampling method was used, 3) if the sample size was adequate, 4) the use of standard measures, 5) whether outcome measurements were made by unbiased assessors, 6) adequacy of the response rate, 7) confidence intervals (CIs) and subgroup analyses, and 8) whether the study subjects were described. Each item was scored as 1 if a study met the criterion, and the scores were summed up. The range of the total score was from zero (lowest possible quality) to 8 (highest possible quality). The studies quality is defined as high-quality (score ≥ 7), medium-quality (score from 4-6) or low-quality (score < 4). The quality assessment results were also checked by a third investigator (12,13).

Statistical analysis

A random effect model was used to investigate the pooled prevalence of, TM, STI and un-protected with 95% CIs. Subgroup analyses were performed based on the study quality and studies design. To evaluate the heterogeneity between the selected studies I^2 test was used. A value of 0% indicates no observed heterogeneity, and larger values show higher heterogeneity, with 0%–25% as low, 25%–50% as moderate and 50%–75% as high heterogeneity. To find the heterogeneity of sources, meta-regression was used based on the design and quality of studies, sample size, and publication year. Publication bias was assessed with Begg-Mazumdar and Egger tests. The Egger results and funnel plot was used to show the severity of publication bias. Additionally, a sensitivity analysis was conducted to assess the stability of the results. The

P -values above 0.05 indicate that the total variance is due to variance within studies and not to variance between studies. Stata version 14 (Stata Corp., College Station, TX, USA) was used for the statistical analysis (14,15).

Results

Included studies

As described in Fig. 1, according to the PRISMA flow chart, 1616 studies were extracted by electronic and manual searching. Of these, 250 were excluded because of duplication. From the remaining 1366 articles, 1301 were excluded after titles and abstracts were assessed. Therefore, 65 studies remained to be carefully checked by examining the full texts. Of which 47 articles were excluded for the following reasons: no relevant data ($n=19$), did not reported the outcome of interest ($n=6$), did not report the prevalence among TM ($n=19$), using modified data ($n=3$). Finally, 18 studies met our eligibility criteria and were included in the systematic review and meta-analysis. We found 18 studies on TM (16-33), 16 studies on unprotected sex (18-33) and 12 on STI (16-18,20,23-25,28-30,32-33). The main characteristics of included studies are described in Table 1. The 18 relevant articles were published from 2002 to 2019 and consisted 14504 study participants, among which 2056 were TM. Among TM participants 955 and 368 were reported to have un-protected sex and STI respectively. Most studies were performed in the South ($n=6$) (17,19,26,28,30,18) and North ($n=6$) (16,20,27,31–33) of Iran. The highest rate of participants comes from Shokoohi et al, study with $n=5395$ individuals (23) and the study by Behzadi et al, (26) had minimum study participants ($n=71$). Totally, in the included studies, 16 were cross-sectional (16-18,20-24,26-33) and 2 were cohort (19,25) in design (Table 1).

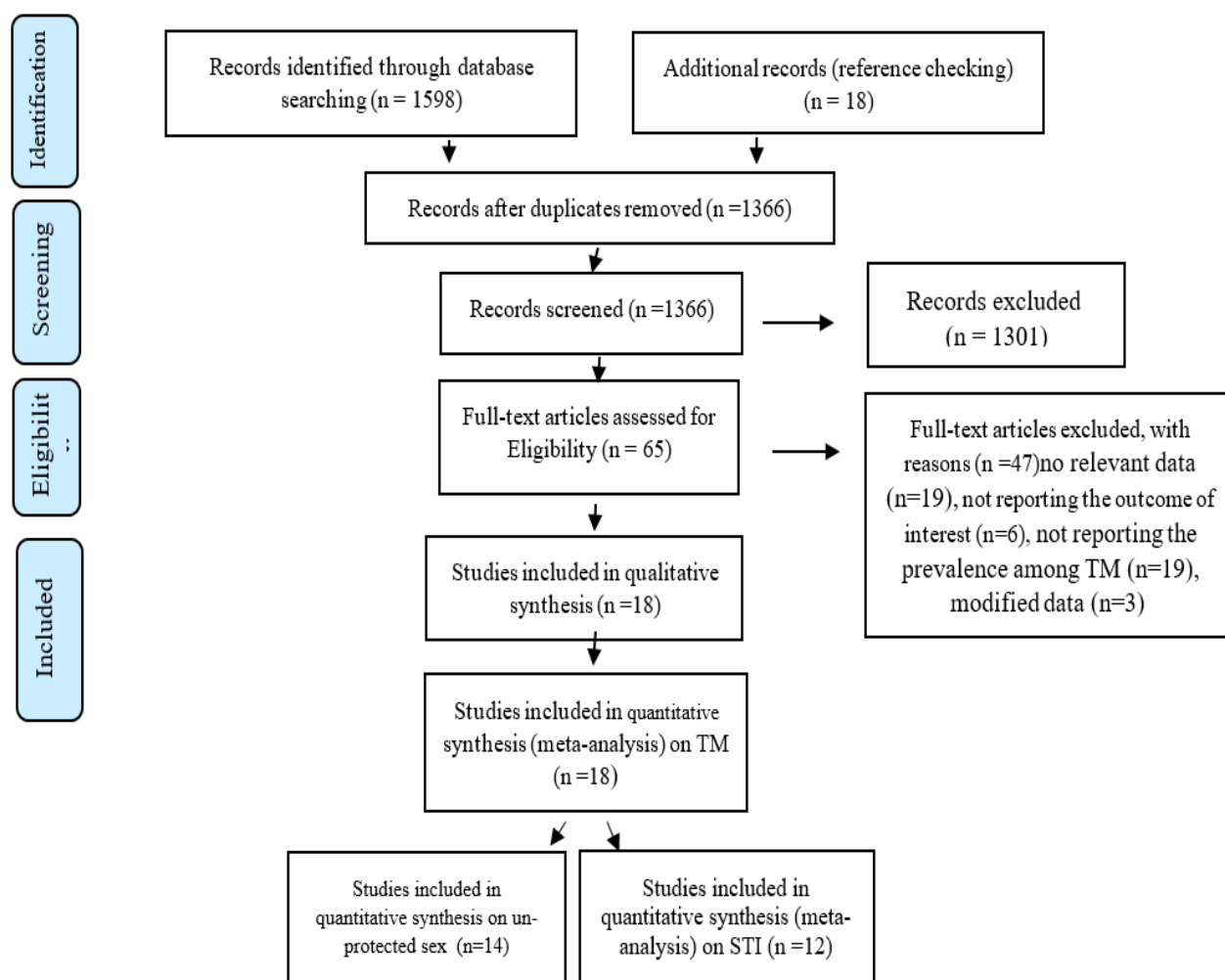


Fig. 1: PRISMA Flow Diagram

According to critical appraisal of systematic reviews for prevalence/incidence studies (13), 12 studies were assigned as “high quality” (16,17,19–24,27,29,31,33), 4 studies as “moderate quality” (18,25,28,32) and the rest 2 studies were grouped as “low quality” (26,30) studies. The results of methodological quality assessment are shown in the Supplementary materials (Table 1).

Pooled prevalence of TM , unprotected sex , STI and meta-regression analysis results

The highest prevalence of TM was 44% (95% CI: 40% to 47%) reported by Shokoohi et al, in 14 cities of Iran (22). The lowest rate was 1.5% (95%

CI: 0.8% to 2%) reported by Hassani et al in Bandar Abbas in Hormozgan Province (29). Based on a random effect model the pooled prevalence of TM was 15% (95% CI: 10% to 19%). The included studies demonstrated a high heterogeneity ($I^2=99.00\%$, $P<0.001$). The results of random effect analysis revealed that the pooled estimate of unprotected sex among TM individuals was 55% (95% CI: 40% to 70%; $I^2=97.89\%$, $P<0.001$). We further assessed the prevalence of STI among TM individuals according to the random effect meta-analysis which was 39% (95% CI: 24% to 54%; $I^2=97.26\%$, $P<0.001$) (Fig. 2).

Table 1: The main characteristics of the studies included in the present systematic review and meta-analysis

Authors / Reference	Province/ year	Study sample size (n)	Study design	Sampling method	Gender n(%)		Mean age	Outcomes: Prevalence%			Quality Assess- ment
					F %	M%		TM %	STI %	Un- pro- tected sex ^o %	
Zargooshi et al (25)	Kermanshah / 2002	100	Cohort	convenience sampling	-	100	26.6	24	100	78	Medium
Ghanbarzadeh et al(28)	Southern Khorasan /2005	200	cross – sectional	Census method	100	-	35.1	11	11	-	Medium
kazem mo- hammad et al (33)	Teh- ran/2007	1385	cross – sectional	Cluster sam- pling	-	100	17.2	14.2	-	63	High
Tehrani et al (24)	Kermanshah 2008	1005	cross – sectional	Segmentation metod	42.4	57.6	34.1	37	34	35.1	High
Alipour et al (17)	Tehran, Shirz Mashhad /2010	452	cross- sectional	convenience sampling	52.2	47.8	35.6	19	3	73	High
Shokoohi et al (23)	14 cities in Iran /2010	1005	cross – sectional	Facility based sampling	100	-	30.1	22.1	17	64	High
Kassaian et al (30)	Isfa- han/2011	100	cross – sectional	convenience sampling	100	-	30.84	34	3	84	Low
Nokhodian et al (18)	Isfa- han/2012	163	cross – sectional	Census method	100	-	34.54	20	1	-	Medium
Shokoohi et al (22)	National /2012	5395	cross – sectional	Multistage clus- ter sampling	49.5	50.5	21.8	10.4	-	78.9	High
Hassani et al (29)	Hor- mozgan/ 2015	600	cross – sectional	Available sam- pling	50	50	25.4	1.5	-	50	High
Rostami et al (20)	Mazandaran /2017	400	cross – sectional	Available sam- pling	100	-	31.99	3	65	70	High
ShahEsmaili et al(21)	National/ 2017	1337	cross – sectional	Facility-based sampling	100	-	35.6	10	50	68	High
Rezaianzadeh et al(19)	Fars/ 2017	1052	Cohort	Census method sampling	21.9	78.1	32.3	1.5	100	-	High
Khoei et al (32)	Teh- ran/2017	300	cross – sectional	Multistage sam- pling	-	100	33.86	1.7	-	80	Medium
Khani et al (31)	Mazandaran 2018	514	cross – sectional	Multistage sam- pling	100	-	31.6	2	56	85	High
Behzadi et al (26)	National /2018	71	cross – sectional	Convenience Sampling	100	-	31.1	7	77	79	Low
Asadi et al (16)	Mazandaran /2018	184	cross – sectional	Convenience Sampling	100	-	32.5	14	-	56	High
Fallahi et al (27)	Teh- ran/2019	241	cross – sectional	quota sampling	100	-	32.3	15	23	88	High

Total=14507

Abbreviations: TM=temporary marriage, STI= sexual transmitted infections. *among TM individuals

We further performed a meta-regression analysis by study design, year and study quality and the results are presented in Table 2. We performed univariate meta-regression analysis to identify possi-

ble variables associated with the rate of prevalence. The result of the meta-regression exploring the association between prevalence TM and year of study is shown in Fig. 3. According, the prevalence of TM shows a significant downward trend

during the recent years ($\beta = -.012, P = 0.03$). Additionally, this trend was also examined for un-protected sex and study year which the association

was a non-significant downwards trend ($\beta = -0.01, P = 0.19$). A similar trend was observed for STI and study year ($\beta = 0.0003, P = 0.98$) (Fig. 3).

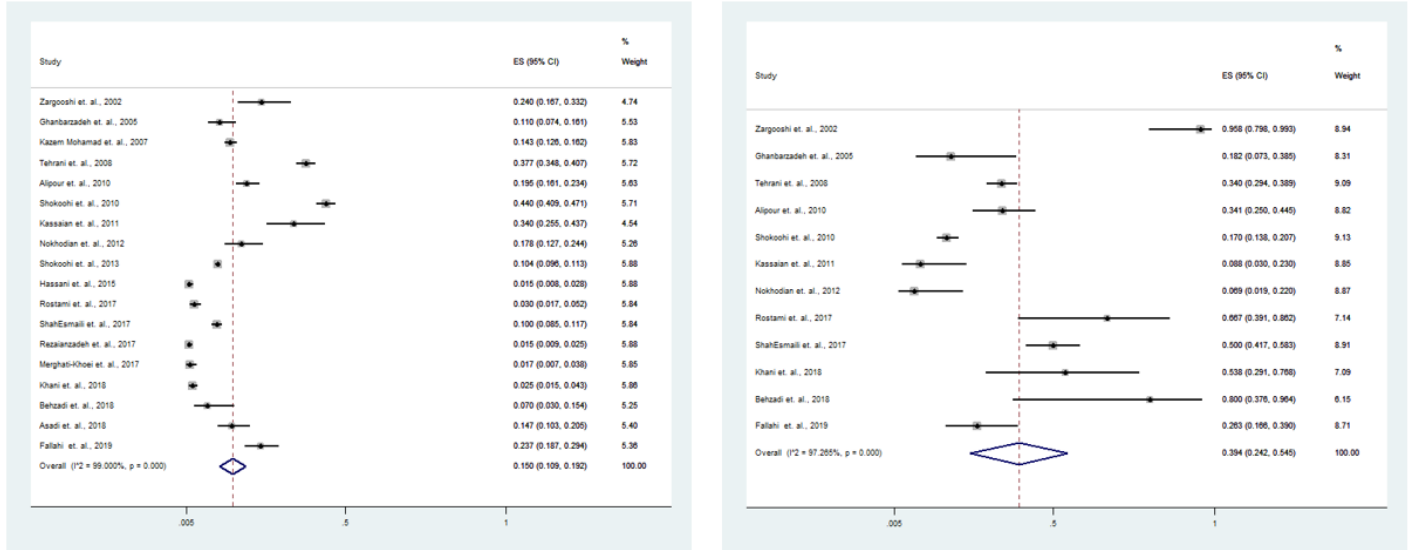


Fig. 2: Forest plots of the included: studies on TM (A) and studies on un-protected sex among TM individuals (B) and studies on STI among TM individuals (C)

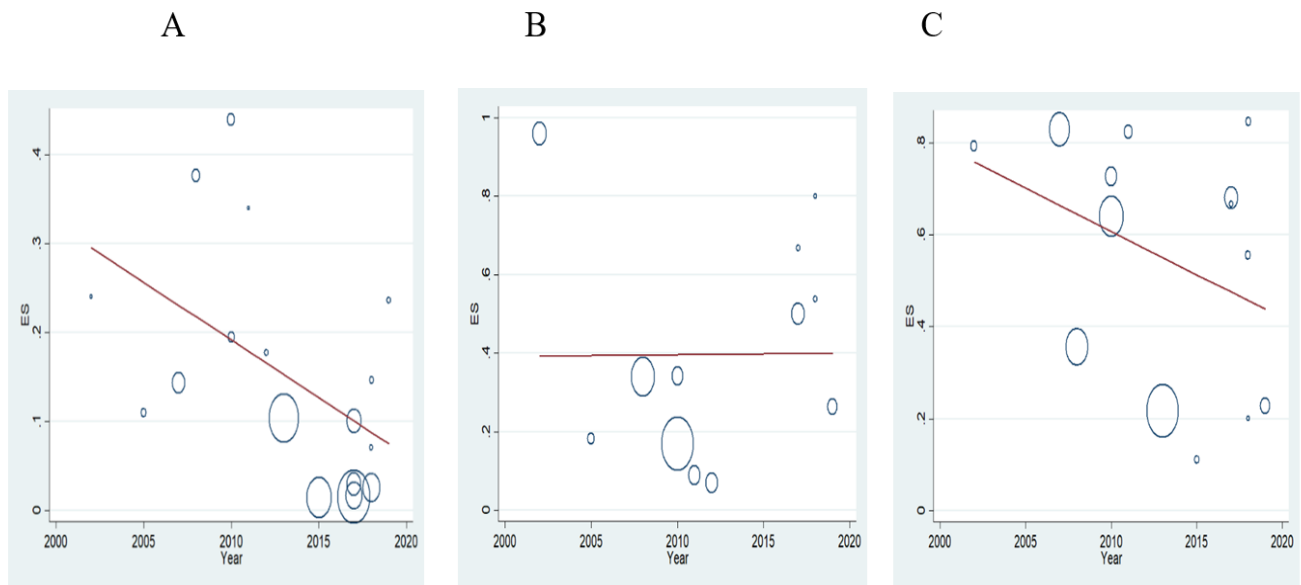


Fig. 3: Meta-regression of the association between the TM prevalence (A), STI prevalence (B), Un-protected sex prevalence (C) during 2002-2019, and year of study

Table 2: Meta Regression results on TM, STI and un-protected sex and study variables

Meta-regression results on TM				
Variable	B	95% Confidence interval		P-value
		Lower	upper	
Year	-0.012	-0.024	-0.001	0.03
Quality design	-0.012	-0.111	0.086	0.78
	-0.034	-0.248	0.179	0.73
Meta-regression results on STI				
Year	0.0003	-0.035	0.036	0.98
Quality design	-0.0027	-0.261	0.256	0.98
	0.630	0.141	1.119	0.017
Meta-regression results on un-protected sex				
Year	-0.018	-0.048	0.011	0.19
Quality design	-0.040	-0.273	0.192	0.712
	0.255	-0.349	0.861	0.375

Publication bias and sensitivity analysis

We used funnel plot and Egger test to assess publication bias. As presented in Fig. 4, a significant publication bias was found on TM ($t=2.81$, $P=0.01$), and STI ($t=3.28$, $P=0.001$) but not for

un-protected sex ($t=1.81$, $P=0.08$) (Fig. 4) (Table 3). Moreover, the results of sensitivity analysis suggest consistency with the result of pooled estimate of the prevalence (data are not shown).

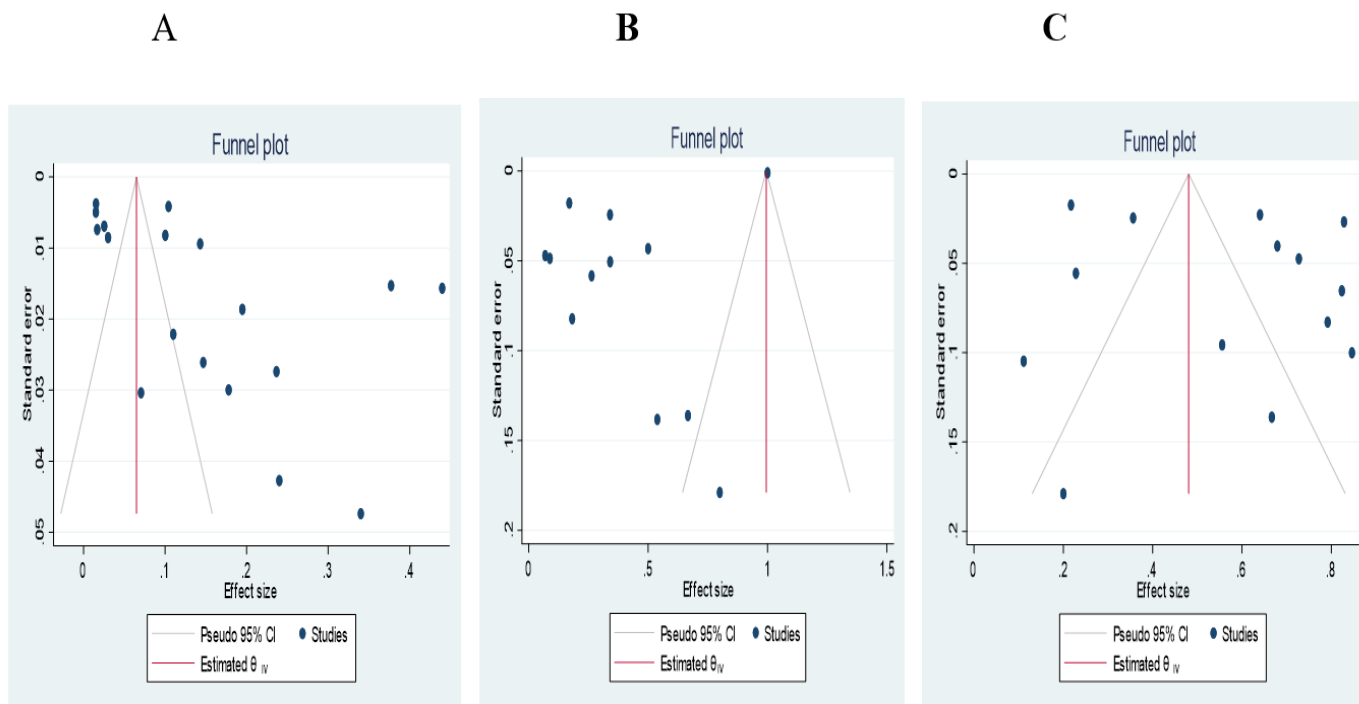


Fig.4: Funnel plot for publication bias of the included studies in the meta-analysis on TM (A) and STI (B) and un-protected sex (C) among TM individuals.

Table 3: Results of Risk Assessment Bias using guidelines for critically appraising studies of prevalence or incidence of a health problem.

Study Author, year	Are the study methods valid?						What is the interpretation of the results?	What is the applicability of the results?	Quality
	a) Are the study design and sampling method appropriate for the research question?	b) Is the sampling frame appropriate?	c) Is the sample size adequate?	d) Are objective, suitable and standard criteria used for measurement of the health outcome?	e) Is the health outcome measured in an unbiased fashion?	f) Is the response rate adequate? Are the refusers described?	Are the estimates of prevalence or incidence given with confidence interval and in detail by subgroup, if appropriate?	Are the study subjects and the setting described in detail and similar to those of interest to you?	
Zargooshi et al(25)	-	-	-	*	-	*	*	*	Medium
Ghanbarzadeh (28)	-	-	*	*	*	-	*	*	Medium
Kazem Mohammad et al(33)	*	*	*	*	*	*	*	*	High
Tehrani et al (24)	*	*	*	*	*	*	*	*	High
Alipour et al (17)	*	-	*	*	*	*	*	*	High
Shokoohi et al (22)	*	*	*	*	*	*	*	*	High
Kassaian et al (30)	-	-	*	-	*	-	-	*	Low
Nokhodian et al (18)	-	-	*	*	*	-	*	*	Medium
Shokoohi et al (23)	*	*	*	*	*	*	*	*	High
Hassani et al (29)	*	*	*	*	*	*	*	*	High
Rostami et al (20)	*	-	*	*	*	*	*	*	High
ShahEsmaili et al (21)	*	*	*	*	*	*	*	*	High
Rezaianzadeh et al (19)	*	*	*	*	*	*	*	*	High
Khoei et al (32)	-	-	*	*	*	-	*	*	Medium
Khani et al (31)	*	*	*	*	*	*	*	*	High
Behzadi et al (26)	-	-	*	-	-	-	*	*	Low
Asadi et al (16)	*	*	*	*	*	*	*	*	High
Fallahi et al (27)	*	*	*	*	*	*	*	*	High

Discussion

The present systematic review and meta-analysis study was conducted to determine the prevalence

of STIs and un-protected sex in temporary marriage in Iran using a systematic review and meta-analysis approach. This meta-analysis which contained on 18 observational studies with 2056 TM-individuals, found that the prevalence of TM about 15% and the prevalence of un-protected sex and STIs among TM-individuals was %55 and 39%, respectively. Indeed, our analysis showed a relatively high prevalence of STI among TM-individuals in Iran.

Throughout the world, most of the studies on TM have been based on legal and jurisprudential approaches or qualitative studies, but this topic with a health-oriented approach has been paid less attention to it. Recently, we found only a quantitative study (cross-sectional) in other Islamic countries on Syrian refugee women showed that 11.5% of TM-wives reported to have STIs and two-third of them reported that their spouses refused to use a condom during their sexual intercourse (34). Lack of reporting STI in TM-individuals in other Islamic countries, perhaps because of social acceptance and the reduction of the stigma of temporary marriage in those communities, TM-individuals like other people, receive health care services, unlike Iranian societies.

The main causes of the increase prevalence of STI among TM-individuals in studies from Iranian were absence trained and misjudged by providers of health care in reproductive and sexual health services, under reporting, poor notification due to social stigma. TM-individuals are an important potential source of STIs, especially treatment-resistant STIs, which easily lead to unprotected sexual behavior due to lack of information (8, 25). Importantly, temporary marriage is not culturally approved by the people, in other words is social taboos, because of temporary wives fear of stigma and social misjudgment, they hide their relationship with their spouses, when they get STI, avoid from undergoing medical care. Moreover, ignorance of participation of men in the use of barrier methods in sexual relations to TM-wives and refuse to go to get medical service in order to receive diagnostic-therapeutic care might worsen the condition. Indeed, sexual dynamic of Iranian men for

example; barriers to condom use, seem to be socio-culturally determined (32, 35). In some studies, having TM is a risk factor of 4.3 times risk for this group getting STIs (27). Therefore this calls an urgent need for community and health care providers to provide especially designed medical and psycho-social supportive care services (i.e.; education, screening for STIs) in a safe and unprejudiced environment for TM individuals.

In the present meta-analysis, because heterogeneity was high, we used random effects model (REM) rather than fixed effect approach for meta-analysis (36). A key benefit of REM is the aggregation of information leading to a higher statistical power and more robust point estimate than is possible from the estimates derived from any individual study. However, in performing a meta-analysis, an investigator must make choices which can affect the results, including deciding how to search for studies, selecting studies based on a set of objective criteria, dealing with incomplete data, analyzing the data, and accounting for or choosing not to account for publication bias (37).

Statistical differences in the results of the above 18 articles can be due to differences in the study sampling method, gender, target population, multiple participants, different method used, difference between specific risk groups, age group and time and place these studies been done. Most studies were conducted in people with high-risk behavior which may limits the interpretation of the results with general population and regard to culture and economic status.

Amongst the strength of this study was the assessment of bias in the selection of the studies and selection of medium and low bias induced studies. Nonetheless, heterogeneity was high, and it remained high after subgroup analyzes. Additionally, another important point which might affect the generalizability of our estimates is the imbalance in study location. All of quantitative studies about STI in TM-individuals, had been done in different province of Iran, and we didn't found study were conducted in other countries, which might influence the generalizability of our study results. Finally, it was impossible to investigate the impact of other demographic factors such as culture and

economic on the estimated prevalence due to the unavailability of relevant information in most studies.

Conclusion

STI is high among TM individuals that may be due to: Absence trained and misjudged by providers of health care, under reporting, poor notification due to social stigma, are additional STI risk factors in this group. The findings suggest health authorities to provide especially designed medical and psycho-social supportive care services (education, screening for STIs) in a safe and unprejudiced environment for TM individuals. Denying the presence of such realities, does not eradicate the facts but results in catastrophic public health problems.

Ethical considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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Conflict of interest

The authors declare that there is no conflict of interest.

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