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Worldwide prevalence of sexual harassment toward nurses: a comprehensive meta-analysis of observational studies

Running head: sexual harassment against nurses

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Authorship

LL and YTX designed the study. LL and MD conducted the data collection, analyzed and interpreted the data. WF and GW participated in the elaboration of analyzing and interpreting the data. LL and YTX drafted the manuscript. Critical revision of the manuscript: GKIL, CHN and GSU revised the manuscript critically. All the authors approved the final version of the manuscript for publication.

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Article type : Review

Worldwide prevalence of sexual harassment toward nurses: a comprehensive meta-analysis of observational studies

Running head: Sexual harassment against nurses

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Abstract

Aims: Sexual harassment toward nurses is a major concern universally, but no meta-analysis on the worldwide prevalence of sexual harassment toward nurses has yet been published. This study examined the worldwide prevalence of sexual harassment against nurses and explored its moderating factors.

Design: Meta-analysis of observational studies.

Data sources: The PubMed, PsycINFO, EMBASE and Web of Science databases from their commencement date to February 2018 were systematically and independently searched by two investigators.

Review Methods: Data on the prevalence of sexual harassment experienced by nurses were extracted and pooled using the random-effects models.

Results: A total of 43 studies covering 52,345 nurses were included in the analyses. Female nurses accounted for 83.87% of the 32,970 subjects in 25 studies with available data on gender ratio. The prevalence of sexual harassment toward nurses in the past 12 months and during nursing career were 12.6% (95% CI: 10.9%–14.4%) and 53.4% (95% CI: 23.1%–83.7%), respectively. Gender, use of the WHO questionnaires, lower middle income and high-income countries, sample size, survey year and mean age of subjects were significantly associated with the prevalence of sexual harassment.

Conclusion: The high prevalence of sexual harassment against nurses found in this meta-analysis represents the ongoing sexism and deleterious effects (e.g., poor work quality and efficiency, increased stress and job dissatisfaction) in the profession. Appropriate preventive measures, training and empowerment of nurses are needed to ensure workplace safety and equality in this profession.

Impact:

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- The study addressed the worldwide prevalence of sexual harassment against nurses and its moderating factors.
- The prevalence of sexual harassment in the past 12 months and during nursing career were 12.6% and 53.4%, respectively.
- Health authorities and hospital administrators should develop organizational policy and preventive strategies to ensure nurses' workplace safety and equality.

Key words: female, meta-analysis, nurse, sexual harassment

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INTRODUCTION

Sexual harassment refers to unwanted, unreciprocated and unwelcome behaviour of a sexual nature that is offensive to the persons involved and could make the persons feel threatened, humiliated or embarrassed (WHO, 2002). In recent decades, sexual harassment toward health professionals, particularly female nurses, has increasingly been a focus of attention worldwide (Clark, Zuccala, & Horton, 2017; Nelson, 2014; Valente & Bullough, 2004). Women account for over 70% of the health and social workforce globally especially in the nursing profession (WHO, 2018). Some studies reported that compared with male nurses, female nurses are more likely to be sexually harassed in workplaces by people who they care for and their family or relatives and even their co-workers (Boafo, Hancock, & Gringart, 2016; Celik & Celik, 2007; Magnavita & Heponiemi, 2011). Such gender disadvantage is often tolerated as a necessary "evil" or a cost of

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keeping a job and not reported in many cases (Celik & Celik, 2007; Fitzgerald, 1993; Valente & Bullough, 2004).

BACKGROUND

In the past decades some studies on sexual harassment have been conducted, but the prevalence of sexual harassment in nurses varied greatly worldwide, ranging from 0.7% to 76% (Abou-ElWafa, El-Gilany, Abd-El-Raouf, Abd-Elmouty, & El-Sayed, 2015; Grieco, 1987; Kamchuchat, Chongsuvivatwong, Oncheunjit, Yip, & Sangthong, 2008). This is partly attributed to the discrepancies in assessment tools, sample size, sampling methods and relevant policies and legislation. Sexual harassment toward nurses has deleterious effects, such as increased stress, poor mental health and quality of life, burnout, job dissatisfaction, poor work quality and efficiency (Ali, Saied, Elsabagh, & Zayed, 2015; Charney & Russell, 1994; Kisa, Dziegielewski, & Ates, 2002; Mushtaq, Sultana, & Imtiaz, 2015; Nielsen et al., 2017).

To develop effective preventive measures and policies to lower the risk of sexual harassment in the nursing profession, ensure the allocation of health human resources, it is necessary to understand the epidemiology of sexual harassment affecting the nursing profession.

THE REVIEW

Aims

We conducted a comprehensive meta-analysis to explore the worldwide prevalence of sexual harassment toward nurses and examine its associated moderating factors.

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Design

In the literature search, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Moher, Liberati, Tetzlaff, Altman, & Group., 2009) and the Meta-analysis of Observational Studies in Epidemiology (MOOSE) guidelines (Stroup et al., 2000) were followed. The protocol was registered in the International Prospective Register of Systematic Reviews (PROSPERO) with the registration number of CRD42018089653.

Search methods and outcomes

Two investigators (LL and DM) independently identified potential publications in PubMed, PsycINFO, EMBASE and Web of Science from their commencement date to February 6, 2018. The following search words were used: (nurses OR nurs* OR (nursing staff) OR (nursing personnel) OR (registered nurses)) AND (sexual harassment) AND (survey OR investigation OR (cross-sectional) OR rate OR prevalence OR epidemiology OR proportion OR percentage OR ratio). Reference lists of the selected literatures were also searched manually to ascertain relevant additional studies.

Search outcomes

Studies were included if they met the following criteria: a) cross-sectional or cohort studies (only the baseline data were extracted for analyses); b) having data on prevalence of sexual harassment or relevant information in nurses (i.e., nurses, nursing assistant and midwife) that could generate the prevalence of sexual harassment defined by the respective studies. To date there has been no agreement on the definition of sexual harassment. Studies that only reported relevant behaviours, such as sexual violence or sexual abuse toward nurses, but did not define "sexual harassment", were excluded. Two investigators (LL and DM) independently screened the initial search literatures by reviewing titles and abstracts and later read full texts to identify eligible studies. If there were more than one publication based on an identical database, only the one with the largest

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sample size was included for analysis.

Quality appraisal

The 22-item Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) was used to assess the quality of included studies (von Elm et al., 2007). In this meta-analysis studies with a STROBE total score >11 were considered as "high quality" (Cao et al., 2015).

Data abstraction

The investigators (LL and DM) extracted the data independently. Any discrepancies in the process were resolved by a discussion with a third researcher (XYT). The following study characteristics were extracted and tabulated: country/region, response rate, sampling method, sample size, mean age, the proportion of female nurses, assessment tools, year of survey, prevalence timeframe and the prevalence of sexual harassment.

Synthesis

The data analyses were conducted using the Comprehensive Meta-Analysis software version 2 (Biostat Inc., Englewood, New Jersey, USA) and STATA version 12.0 (Stata Corporation, College Station, Texas, USA). The square root transformation method (Freeman & Tukey, 1950) was used to synthesize the prevalence of sexual harassment with 95% confidence intervals (CI). Heterogeneity across studies was measured by I^2 statistic; high heterogeneity was defined as I^2>50% (J. P. Higgins, Thompson, Deeks, & Altman, 2003). The random-effects model was used if the I^2 was larger than 50%; otherwise, the fixed-effects model was applied (J. P. Higgins et al., 2003).

To detect the possible sources of heterogeneity, subgroup analyses and meta-regression analyses were performed (meta-regression analysis was only conducted when 10 or more studies

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with relevant data were available (Julian PT Higgins & Green, 2011). Subgroup analyses of the 12-month prevalence of sexual harassment were conducted based on the following categorical variables: economic level classified by the World Bank (low income/lower middle income/upper middle income and high income) (Worldbank, 2017); assessment tools (measure on workplace violence-World Health Organization (WPV-WHO; i.e., measures recommended by the WHO and the programs launched by the International Labour Office (ILO), International Council of Nurses (ICN) and WHO and Public Services International (PSI) (WHO, 2003) / self-designed questionnaires / other measures). Sample size was dichotomized by the median splitting method to conduct subgroup analyses. Due to inadequate data available, subgroup analyses of sexual harassment in nursing career was not performed. Meta-regressions were conducted based on the following continuous variables: proportion of female nurses, mean age, year of survey and sample size. Funnel plots and Egger's regression model (Egger, Davey Smith, Schneider, & Minder, 1997) were used to check publication bias. Sensitivity analyses were performed by removing the included study individually to assess the consistency of the results. The level of significance was set at $p<0.05$ (two-tailed).

Results

Search results

Out of 518 potential papers identified, a total of 43 studies with 52,345 nurses met the inclusion criteria and were included for analyses (Figure 1). The two studies that reported prevalence of two types of (internal and external) verbal sexual harassment separately (Demir & Rodwell, 2012; Rodwell & Demir, 2014) and three studies that reported physical and/or verbal sexual harassment separately (Hesketh et al., 2003; McKenna, Poole, Smith, Coverdale, & Gale, 2003; Zeng et al., 2013) were not included as the overall prevalence of sexual harassment were not reported. In addition, the full texts of two papers were not assessable and were excluded (Kaye, Donald, & Merker, 1994; Madison, 1997).

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Study characteristics and quality assessment

Study characteristics are shown in Table 1. Twenty-eight studies (46,470 subjects) reported the 12-month prevalence of sexual harassment, six studies (2,023 subjects) reported the prevalence during nursing career, one study reported the 6-month prevalence (Fute, Mengesha, Wakgari, & Tessema, 2015), one study reported the prevalence in the past 2 years (Cogin & Fish, 2009) and seven studies did not specify the timeframe of the prevalence. The STROBE score ranged from 12-22 with a mean value of 18 among the included studies. All the 43 studies were considered as "high quality".

Prevalence of sexual harassment

The pooled prevalence of sexual harassment in the past 12 months from 28 studies and within the nursing career from six studies with available data were 12.6% (95% CI: 10.9–14.4%; Figure 2) and 53.4% (95% CI: 23.1–83.7%; Figure 3), respectively. Supplemental Figure 1 and Egger's tests showed that there was no publication bias for the 12-month prevalence of sexual harassment (t=0.77, 95%CI: -4.22-9.28, P=0.45). The 6-month prevalence was 13.0% in one study in Ethiopia (Fute et al., 2015), while the prevalence in the past 2 years was 45.0% in one study in Australia (Cogin & Fish, 2009). Seven studies reported the prevalence of sexual harassment without timeframes: the prevalence were 71.5% in Pakistan (Mushtaq et al., 2015), 70.2% in Egypt (Ali et al., 2015), 56.0% in Japan (Hibino, Hitomi, Kambayashi, & Nakamura, 2009), 37.1% in Turkey (Celik & Celik, 2007), 9.4% in Saudi Arabia (Mohamed, 2002), 65.8% in the USA (West, Holoviak, & Figler, 1995) and 71.8% in the USA (Libbus & Bowman, 1994).

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Subgroup and meta-regression analyses

The subgroup analyses are presented in Table 2. The 12-month prevalence of sexual harassment assessed by the WHO recommended questionnaires (6.0%) was significantly lower than the figures in studies using self-designed questionnaires (11.5%) or other measures (24.4%). In addition, the 12-month prevalence of sexual harassment was highest in high-income countries (17.2%), followed by lower middle (15.8%), low income (10.0%) and upper middle countries (5.1%). The 12-month prevalence of sexual harassment were higher in studies with smaller sample size (21.0% vs. 7.3%) than those with relatively larger sample size.

Meta-regression analyses revealed that the proportion of female nurses (Coefficient =-0.044, P<0.001, respectively), year of survey (Coefficient =-0.056, P<0.001, respectively), mean age (Coefficient =-0.039, P<0.001, respectively) and sample size (Coefficient =-0.0001, P<0.001, respectively) were significantly associated with the 12-month prevalence (Supplemental Table 1). Sensitivity analyses revealed that after removing each study sequentially, the results of the 12-month prevalence of sexual harassment did not significantly change compared with the primary results.

Discussion

To the best of our knowledge, this was the first comprehensive meta-analysis to examine the prevalence of sexual harassment toward nurses. The pooled prevalence of sexual harassment toward nurses in the past 12 months and during nursing career was 12.6% and 53.4%, respectively.

Findings about the gender difference in prevalence of sexual harassment have been mixed. In some studies workplaces with higher proportion of females were associated with increased risk of sexual harassment (Boafo et al., 2016; Celik & Celik, 2007; Cogin & Fah, 2007), while opposite findings were also reported (Sisawo, Ouedraogo, & Huang, 2017; Zeng et al., 2013). In this meta-analysis, compared with male nurses, female nurses reported lower prevalence of sexual harassment. Female nurses' reactions to sexual harassment could be passive (Adams, Darj,

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Wijewardene, & Infanti, 2019). For example, 38.4% and 59.4% of nurse victims of sexual harassment in Egypt and Turkey, respectively chose to ignore the harassment (Ali et al., 2015; Celik & Celik, 2007). Shame and embarrassment are often a deterrent to making a report (Dan, Pinsof, & Riggs, 1995). In addition, sexual harassment by patients was sometimes neglected (Viglianti, Oliverio, & Meeks, 2018). As a result, under-reporting of sexual harassment (Hibino et al., 2009) would most certainly lead to under-estimation of the prevalence in female nurses.

The variation in the prevalence of sexual harassment across countries could be related to the differences in economic and education levels as well as cultural factors (Hibino et al., 2009). For example, nurses in high-income countries usually receive more education and training on occupational safety and health (van Dijk, Bubas, & Smits, 2015) and have more opportunity to report workplace violence including sexual harassment as was found in this meta-analysis. The prevalence of sexual harassment has decreased over time. There is no clear explanation for this finding except for assuming the recently introduced preventive measures on sexual harassment led to the reduction of sexual harassment.

We found that the prevalence of sexual harassment was relatively higher in studies with smaller sample size. No obvious external factor could cause a systemic distortion in smaller studies, therefore we speculate that the results of smaller studies may be more unstable (Cao et al., 2017).

Earlier studies found that nurses who were younger were prone to be sexually harassed (Grieco, 1987; Hibino et al., 2009; Suhaila & Rampal, 2012), which is consistent with our finding that younger age was associated with higher 1-year prevalence of sexual harassment. Age-related difference about the perception of sexual harassment has been previously examined concluding that younger nurses are better aware of sexual harassment and more likely to report it (Hibino et al., 2009).

No universally accepted instrument to assess and recognize sexual harassment currently exist (Nielsen et al., 2017). There was significant difference in the prevalence of sexual harassment between studies using different instruments. The prevalence was lower in studies using the WHO recommended questionnaires than those using self-designed questionnaires or other measures.

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Different content, item numbers and assessment methods (self-reported vs. interviewer-rated) and various cut-off values are likely to lead to different results. It should be noted however, that in the subgroup analysis of the 12-month prevalence, the relatively small number of studies using self-designed questionnaires (N=5) could have created a degree of bias.

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Limitations

There are several limitations in this meta-analysis. First, different assessment tools and definitions of sexual harassment were employed across studies, which was associated with high heterogeneity in the results. Second, moderating factors were only limited to basic demographic characteristics. There was inadequate data on important factors related to sexual harassment, such as work shifts, nursing ranking and education level. In addition, perpetrators of harassment and nurses' reactions were not analyzed due to limited data in included studies. Third, the results of subgroup analyses could be potentially moderated by certain confounding variables, which cannot be controlled for in meta-analysis. Lastly, heterogeneity cannot be eliminated in epidemiological surveys even if subgroup analyses are conducted to adjust for the heterogeneity (Li et al., 2016; Long et al., 2014; Winsper et al., 2013).

CONCLUSION

In conclusion, this meta-analysis confirms the high prevalence of sexual harassment toward nurses, particularly in lower middle- and high-income countries. Sexual harassment has deleterious effects (e.g., increased stress and job dissatisfaction and poor work quality and efficiency) on the nursing profession. To ensure workplace safety and equality, preventive strategies should be taught in nursing training, such as the critical consciousness raising amongst nursing students (Harden, 1996), which could also be applied to other health professionals including nurses and approaches of respond to sexual harassment in their workplaces. Apart from staff supports and welfare, better

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organizational policies should be developed and implemented at institutional, regional and national levels. There is also a need to introduce effective reporting systems for sexual harassment and to further promote the empowerment of nurses to effectively reduce the risk of sexual harassment.

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Conflict of Interest

The authors declare that they have no competing interests related to the topic of this study.

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Figure 1. Flowchart of selection of studies

Figure 2. Forest plot of the prevalence of sexual harassment within last 12 months against nurses (28 studies)

Figure 3. Forest plot of the prevalence of sexual harassment during nursing career (6 studies)

Supplementary Figure 1: Funnel plot of the 28 included studies reporting the 12-month prevalence of sexual harassment

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Table 1. Characteristics of the studies included in the meta-analysis

No.	Study	Country/Region^	Response rate (%)	Sample size	Age (years) Mean/Range	Female (%)	Assessment Tools #	Survey year	Period experienced *	STROBE score
1	Zhang 2017 (Zhang et al., 2017)	China	93.0	3004	29.4	97.0	WPV-WHO	05/2014-09	Last 12 ms	20
2	Sisawo 2017 (Sisawo, Ouedraogo, & Huang, 2017)	Gambia	98.2	219	NR	73.1	WPV-WHO	06/2014-09	Last 12 ms	20
3	Shi 2017 (Shi et al., 2017)	China	74.8	15970	<30	97.6	WPV-WHO	12/2014-01/2016	Last 12 ms	22
4	Cheung A 2017 (Cheung & Yip, 2017)	Hong Kong SAR, China	5.3	850	18-65	87.6	WPV-WHO	10/2013-11	Last 12 ms	20
5	Cheung B 2017 (Cheung, Lee, & Yip, 2017)	Macau SAR, China	80.0	613	>20	NR	WPV-WHO	08/2014-12	Last 12 ms	20
6	Chang 2016 (Chang & Cho, 2016)	Korea	NR	312	23.7	94.2	COPSOQ II	10/2012-09/2014	Last 12 ms	19
7	Boafo 2016 (Boafo, Hancock, & Gringart, 2016)	Ghana	58.0	592	31.8	79.2	WPV-WHO	09/2013-04/2014	Last 12 ms	20
8	Alkorashy 2016 (Alkorashy & Al Moalad, 2016)	Saudi Arabia	80.8	370	NR	93.2	WPV/A-MNA	03/2011-05/2011	Last 12 ms	20
9	Likassa 2015 (Likassa & Jira, 2015)	Ethiopia	94.4	203	32.9	56.7	WPV-WHO	02/2012	Last 12 ms	20
10	Pinar 2015 (Pinar et al., 2017)	Turkey	89.6	4343	NR	NR	WPV-WHO	09/2012-05/2013	Last 12 ms	21
11	Park 2015 (Park et al., 2015)	Korea	95.2	970	28.6	100.0	COPSOQ II	NR	Last 12 ms	21
12	Mushtaq 2015 (Mushtaq et al., 2015)	Pakistan	NR	200	29.8	100.0	SHEQ	NR	NR	17
13	Fute 2015 (Fute, Mengesha, Wakgari, & Tessema, 2015)	Ethiopia	97.3	642	30.2	62.9	WPV-WHO	04/2014	Last 6 ms	21
14	Fallahi Khoshknab 2015 (Fallahi Khoshknab et al., 2015)	Iran	90.4	5363	NR	NR	WPV-WHO	2011	Last 12 ms	21
15	Ali 2015 (Ali et al., 2015)	Egypt	86.0	430	35.9	NR	Self-designed	06/2014-08	NR	19
16	Abou-ElWafa 2015 (Abou-ElWafa et al., 2015)	Egypt	96.2	275	31.8	93.5	WPV-WHO	01/2013	Last 12 ms	20
17	Kvas 2014 (Kvas & Seljak, 2014)	Slovenia	18.2	692	NR	NR	Self-designed	11/2010-02/2011	Last 12 ms	19
18	Suhaila 2012 (Suhaila & Rampal, 2012)	Malaysia	100	455	37.0	100.0	USHQ	01/2009-03	Last 12 ms	19
19	Joa 2012 (Joa & Morken, 2012)	Norway	75.0	316	NR	NR	OV-A	01/2009-02	Last 12 ms	19
20	Fujita 2012 (Fujita et al., 2012)	Japan	79.1	4298	NR	NR	Self-designed	01/2009-12	Last 12 ms	19
21	Wu 2012 (Wu et al., 2012)	China	79.0	1033	NR	96.7	Wang PX	10/2009-11	Last 12 ms	18
22	Talas 2011 (Talas, Kocaoz, & Akguc, 2011)	Turkey	47.5	61	NR	NR	Self-designed	03/2009-08	Last 12 ms	18
23	Pai 2011 (Pai & Lee, 2011)	Taiwan, China	77.9	521	36.2	95.6	WPV-WHO	NR	Last 12 ms	18
24	Magnavita 2011 (Magnavita & Heponiemi, 2011)	Italy	94.2	275	NR	77.1	VIF-I	NR	Last 12 ms	17
25	Hibino 2009 (Hibino et al., 2009)	Japan	77.3	464	NR	89.7	SESRA-S	200411	NR	19

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26	Cogin 2009 (Cogin & Fish, 2009)	Australia	21.6	287	>18	NR	SEQ-F	NR	Last 2 years	19
27	Buerhaus 2009 (Buerhaus, DesRoches, Donelan, & Hess, 2009)	USA	NR	468	NR	92.1	Self-designed	03/2008-06	Last 12 ms	14
28	Kamchuchat 2008 (Kamchuchat et al., 2008)	Thailand	91.7	545	34.9	97.2	WPV-WHO	2005	Last 12 ms	19
29	Nachreiner 2007 (Nachreiner et al., 2007)	USA	78.0	3738	46.3	96.0	Self-designed	08/1998-03/2000	Last 12 ms	18
30	Celik 2007 (Celik & Celik, 2007)	Turkey	51.7	622	NR	NR	Self-designed	NR	NR	20
31	Kwok 2006 (Kwok et al., 2006)	Hong Kong SAR, China	25.0	420	NR	91.9	WPV-WHO	NR	Last 12 ms	15
32	Gunnarsdottir 2006 (Gunnarsdottir, Sveinsdottir, Bernburg, Fridriksdottir, & Tomasson, 2006)	Iceland	66.0	394	NR	100.0	Standard questions	NR	NC	16
33	Chuang 2006 (Chuang & Lin, 2006)	Taiwan, China	80.9	307	NR	NR	Self-designed	NR	NC	16
34	Nijman 2005 (Nijman, Bowers, Oud, & Jansen, 2005)	UK	39.0	154	NR	57.8	POPAS	NR	Last 12 ms	15
35	Mohamed 2002 (Mohamed, 2002)	Saudi Arabia	86.8	434	36.1	78.6	Structured	NR	NR	16
36	Kisa 2002 (Kisa et al., 2002)	Turkey	61.0	215	26.0	NR	Self-designed	NR	NC	16
37	Williams 1996 (Williams, 1996)	USA	30.0	345	NR	NR	NAS	NR	Last 12 ms	17
38	Kisa 1996 (Kisa & Dziegielewski, 1996)	Turkey	46.6	184	25.8	NR	SHI	NR	NC	18
39	West 1995 (West, Holoviak, & Figler, 1995)	USA	40.0	695	NR	NR	Self-designed	NR	NR	14
40	Libbus 1994 (Libbus & Bowman, 1994)	USA	39.5	78	38.0	NR	Self-designed	NR	NR	13
41	Finnis 1994 (Finnis & Robbins, 1994)	UK	56.0	65	NR	NR	SHI	NR	Last 12 ms	14
42	Donald 1993 (Donald & Merker, 1993)	USA	47.0	461	NR	NR	Self-designed	NR	NC	12
43	Grieco 1987 (Grieco, 1987)	USA	29.0	462	35.5	93.9	Self-designed	NR	NC	16

NR: Not reported

^ Country/Region: UK= United Kingdom; USA= United States

Assessment tools: COPSOQ II= The second version of the Copenhagen Psychosocial Questionnaire; NAS = Nurse Assault Survey developed by the Nurse Assault Project Team in Ontario, Canada; OV-A= Australian questionnaire regarding occupational violence among GPs; POPAS = Perceptions Of Prevalence of Aggression Scale; SEQ-F = Sexual experiences questionnaire by Fitzgerald et al. ; SESRA-S = Scale of Egalitarian Sex Role Attitudes by Suzuki; SHEQ= Sexual Harassment Experience Questionnaire by Kamal; SHI= Cholewinski & Burge's Sexual Harassment Inventory; USHQ = Utara Sexual Harassment Questionnaire by Sabitha; WPV/A-MNA = questionnaire from the Massachusetts Nurses Association Survey on Workplace Violence/Abuse; Wang PX= questionnaire designed by Wang PX et al. ; WPV-WHO = questionnaire was recommended by WHO and from the programs launched by the International Labour Office(ILO), International Council of Nurses(ICN), World Health Organization (WHO) and Public Services International(PSI); VIF-I = Italian version of the Violent Incident Form.

* Period experienced: Last 6 ms=Last 6 months; Last 12 ms=Last 12 months; NC=Nursing careers.

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Table 2. Subgroup analyses of the 12-month prevalence of sexual harassment against nurses.

Subgroups	Categories (Number of studies)	Prevalence (%)	95%CI (%)		Events	Sample size	I^2 (%)	*P* within subgroup*	*Q (P) *; across subgroups*
Economic	Low income (2)	10.0	7.1	12.8	42	422	0	<0.001	12.0 (0.007)
level	Lower middle income (2)	15.8	8.2	23.5	127	867	87.6	<0.001	
	Upper middle income (8)	5.1	3.6	6.5	1199	30774	97.5	<0.001	
	High income (16)	17.2	13.0	21.5	1895	14407	98.8	<0.001	
Assessment	WPV-WHO[+] (13)	6.0	4.8	7.3	1340	32918	97.0	<0.001	24.7 (<0.001)
tool	Self-designed (5)	11.5	6.0	17.0	1106	9257	99.7	<0.001	
	Others (10)	24.4	16.4	32.4	817	4295	99.1	<0.001	
Sample size	≤495 (14)	21.0	14.7	27.4	743	3938	97.2	<0.001	16.4 (<0.001)
	>495 (14)	7.3	5.5	9.1	2520	42532	98.9	<0.001	
Total (28)		12.6	10.9	14.4	3263	46470	98.6	<0.001	

*: Q-test for heterogeneity.

[+]: WPV-WHO = questionnaire was recommended by WHO and from the programs launched by the International Labour Office(ILO), International Council of Nurses(ICN), World Health Organization (WHO) and Public Services International(PSI);

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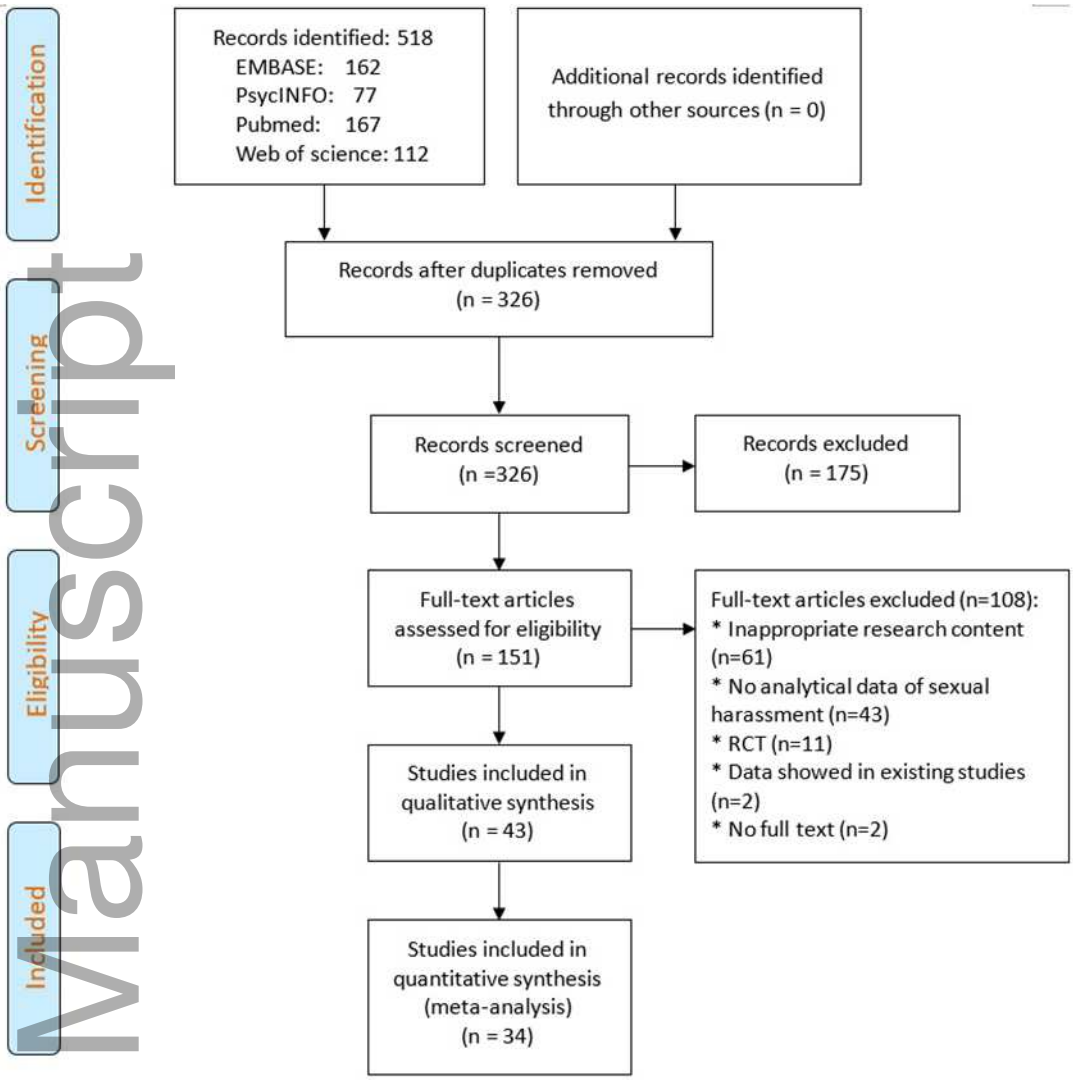

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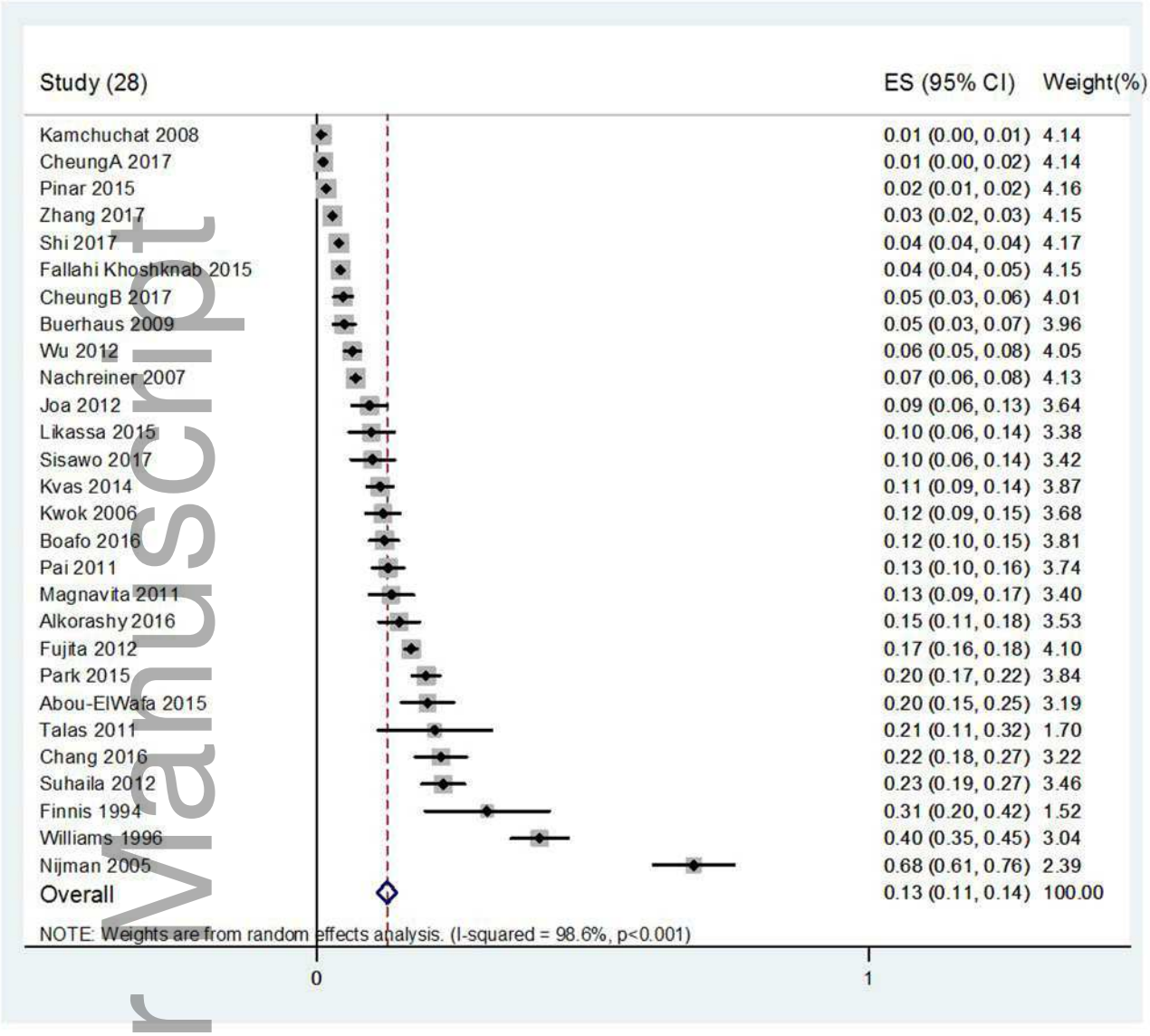

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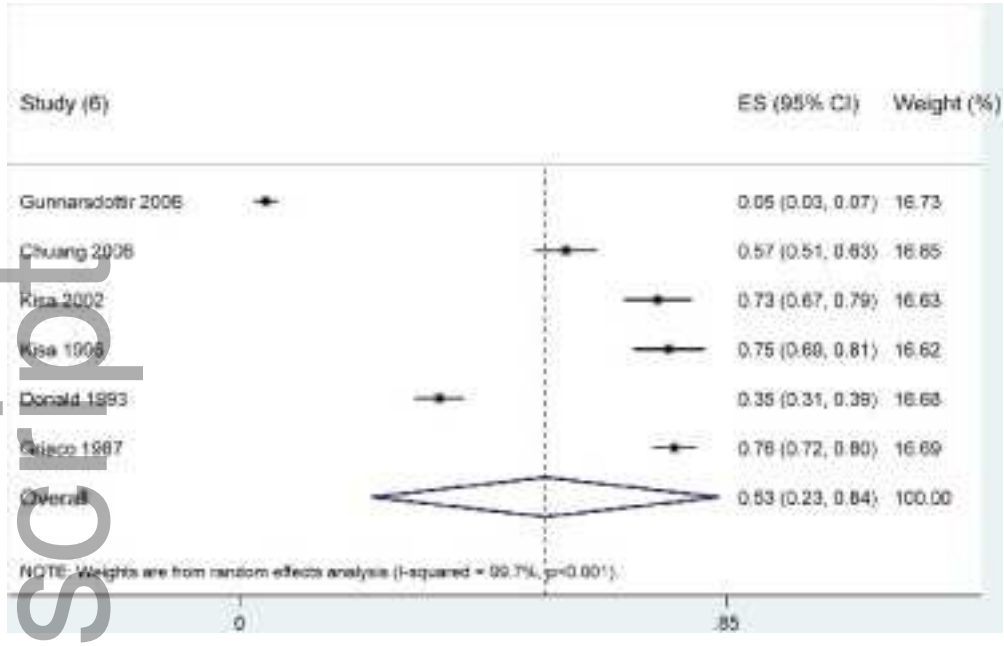

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