Workplace barriers and facilitators to nurses’ healthy eating behaviour: Qualitative Systematic Review

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Abstract

Background: Workplace environment has greatly impacted the eating practices of nurses that led to them being overweight and obese. Obesity still exists because of the unhealthy eating habits in the workplace – which eventually affects patients’ care, nurses’ health, and one’s capability to work properly. The aim is to conduct a systematic review to find the healthy eating barriers and facilitators among nurses in the clinical workplace.

Methods: This review was conducted using the Joanna Briggs Institute methodology for systematic reviews. Sources searched through eight electronic databases: PROQUEST CENTRAL, SCIENCE DIRECT, MEDLINE, CINAHL, PsycINFO, WEB SCIENCE, PUB MED and SCOPUS were conducted. All articles were imported into JBI SUMARI for screening purpose. Quality appraisal of the included articles were performed through JBI critical appraisal checklist for qualitative studies. All findings of the included articles were extracted through the JBI data extraction tool.

Results: Nine qualitative studies were included in the review. The experiences of 488 nurses generated a total of 37 findings. Two synthesized findings were generated from the categories: (i) Barriers to healthy eating; and (ii) Facilitators to healthy eating. Most studies reported facilitators and barriers to healthy eating. Most of the barriers and the facilitator were related to the organization (night shift and long working hours), personal, physical workplace environment and social.

Conclusions: The review results, illustrate clear direction to promote healthy eating on organizational, personal, environmental, and social levels that are attainable in a workplace.

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What Is Already Known

- Many barriers can affect the nurse’s healthy eating behaviours such as personal and environmental barriers.
- Limited number of literatures highlighted the facilitators to promote healthy eating behaviours among nurses.

What this paper adds

- Interventions and facilitators targeting the healthy eating behaviours among nurses were identified; including personal, organizational, and social facilitators.
- These facilitators encourage the nurses to practice healthy eating behaviours during clinical practice.

Background

Nurses are representing the largest workforce among all health care providers [1]. According to the World Health Organization (WHO), the workforce of nurses is around 27 million staff representing approximately 50% of the health care workers all over the world [1]. Nurses are considered a precious stone due to their important role in patient care focusing on health promotion and disease prevention for patients and the community as a whole [2]. Nurses are spending approximately two-thirds of their day hours as work shifts [3]. This is resulting in that nurses are paying attention to improving patients’ lifestyles and neglect their own which has a great impact on their physical and mental health and work performance [2]. A study found that nurses and midwives (globally) have a higher occurrence of being obese and overweight compared to the general population [4].

In the UAE, a study was performed to explore the obesity prevalence among HCPs [5]. The study found that despite that 94.7% of the HCPs believed in being a role model for patients, 37.2% of them were suffering from overweight and 12.7% were obese [5]. The negative consequences faced by obese nurses can affect their ability, effectiveness in providing the healthcare and it will affect their physical and or intellectual capability such as cardiopulmonary resuscitation [6].

Healthy eating is one of the essential elements of an individuals’ lifestyle, especially for nurses who exert great physical efforts during work time [3]. Promoting healthy eating behaviours remains a great challenge facing nurses due to occupational demands. Study indicates that nurses are not taking their meals that, contain high portions of fruits, vegetables, and whole grains and are low in Trans fats and sugar. In addition, a study revealed that 53.9% of the nurses consumed foods that were high in fat and sugar [7].

The workplace culture can play major role in enhancing the healthy eating habits among nurses through involving managers and all staff to encourage changing the practice and increase the enthusiasm; ensuring availability of healthy food in the health facility canteen with a good price [8, 9]; increase budget and resources through partners for gyms or wellbeing facilities and businesses to provide benefits to staff; involving dietitians and the experienced success models as initiatives [10, 11]; ensure continuous colleagues support; decrease staff workload and stress and provide adequate time for breaks [12, 13].

A previous systematic review found that the workplace culture is negatively affecting nurses’ healthy eating habits due to factors related to working schedules, personal, workplace environment, and social eating habits [14]. Nurses who were on night shift duties were inspired by their colleagues’ habits of diet – both in an optimistic and pessimistic way. Moreover, nurses reported that the support of colleagues made it easier to begin the practice of healthy eating. On the other hand, peer pressure to eat junk food by celebrating an occasion also impacted their eating habits [7].

Further analysis of literature is required to explore the facilitators and barriers of healthy eating among nurses in the workplace that were not addressed by previous reviews. The result of this systematic review will help nurses to make an intervention to adopt healthy eating behaviours.
What are the barriers and facilitators of healthy eating among nurses in the clinical workplace?

Methods

Design

A systematic search of the literature was conducted and reported using the Joanna Briggs Institute (JBI) methodology for qualitative methods systematic reviews [15]. The PRISMA systematic review reporting checklist [16] was used as a basis for reporting the review.

Selection criteria

This review included primary qualitative studies and include participants who were working nurses. The studies on students and unqualified staff working with the help of qualified staff were included.

Search strategy

The structured search strategy was carried out utilizing eight electronic databases considering peer-reviewed articles published in English from 2000 to 2022. Databases included PROQUEST CENTRAL, SCIENCEDIRECT, MEDLINE, CINAHL, PsycINFO, WEB SCIENCE, PUB MED and SCOPUS. Furthermore, Hand searching was conducted through reference lists utilizing Google Scholar to retrieve additional papers. All searches incorporated the terms (Nurses; Healthy eating; nutrition; Occupational stress; Occupational health and obesity). The MESH terms [with the use of Boolean operators OR and AND] were used to develop a full search strategy for each included database (see Table 1).

All identified citations were collated and uploaded into the bibliographic software, Endnote X9, and duplicates removed. The titles and abstracts were screened independently by two reviewers (AS & FH) and full texts of relevant studies were retrieved and assessed in detail. The reference lists of the included studies were hand-searched, abstracts were screened, and the full text of potentially relevant articles was reviewed.

Study selection

The comprehensive search generated 359 articles, the reference lists of the articles were examined, and from those 6 articles were identified. The 28 were duplicates and 337 were left after the removal of the duplicates. The 337 articles, remaining, were screened for relevance by using the title and abstract – 18 were retrieved for potential inclusion, full-text articles and then those were reviewed for eligibility. Amongst all 18 studies, 9 did not fall on the standards of the inclusion criteria during the full text and were excluded. The reasons for exclusion were (1) no data on barriers and/or facilitators to healthy eating; (2) not included working nurses; (3) not a primary data source; (4) quantitative studies only; (5) students only. Total of nine papers were appraised and were included in the systematic review; in which all were qualitative (interviews and focus groups) (Fig. 1). The full details for the excluded studies were recorded in the systematic review JBI SUMARI. The results of search and the study inclusion process were presented in Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA 2020) flow diagram [17].

Methodological quality assessment

Methodological quality assessment was done using the JBI critical appraisal tool to evaluate all the eligible studies which were conducted by two independent author and reviewer (EA & FH) and checked by a third reviewer (AS or IA). JBI Checklist for Analytical Qualitative Research was used as the included studies are with qualitative designs. Each question was given a score (Yes = 2, No = 0, Unclear = 1), and provided an overall score for all studies which then translated to a percentage. Nine studies were thoroughly appraised. None of the studies were excluded in terms of methodological quality, as all scored higher than 70%. The three qualitative studies had highest score of 90%, five studies had lowest score of 80% and, one study had scored 100%. The included studies’ critical appraisal results were indicated in Table S1.

Data extraction

Data was extracted from the qualitative studies by two independent reviewers using the standardized JBI data extraction tool [18]. The extracted data included specific details about; the study, methods for data collection and analysis, country, phenomena of interest, setting/context/culture, participant characteristics and sample size, and the description of main results at the level of the themes and subthemes supported with the verbatim quotes – which gave meaning to the results and supported the review objective. The data extraction table is provided in (Table 2).

Data synthesis

The qualitative data was synthesized using (JBI SUMARI) with the meta-aggregation approach which identifies meanings and further abstracts those meanings into categories that are then synthesized. The extracted findings were assembled according to the themes and subthemes along with their evidence of illustrations (see Table 3a and 3b). Each finding was assigned according to JBI levels of credibility based on the outcomes with supporting data. All findings were allotted credible against the three levels of credibility: unequivocal, credible, and unproven. The results were arranged in seven categories generating two comprehensive statements that combined the categories. Four categories were arranged into synthesized findings 1 (barriers to healthy
eating), and three categories were collated into synthesized findings 2 (facilitators to healthy eating). Finally, meta-aggregation flow chart was developed (see Figure 2 and 3).

**Results**

**Characteristics of Included Studies**

All studies were published between 2000 [19] and 2022 [20, 21]. From nine of the qualitative studies, two study used focus group method for collecting data [22, 23], the five conducted semi-structured interview [219, 21, 24, 25], one study conducted focus group or semi-structured interview [20] and one conducted online survey through qualitative analysis [26]. The included papers participants were; Registered nurses, inexperienced nurses (those who graduated recently from nursing colleges and universities and worked less than a year), Nurses working full-time and part-time, Charge Nurse, Head Nurse, Research nurse/research coordinator, Advanced practice-nurse practitioner, clinical nurse specialist, certified registered nurse anesthetist, Nursing officers, Principal nursing officer, Senior nursing officers, Chief nursing officers, and Director. They worked in various types of locations; mostly were hospitals – but community hospitals, medical centers, and teaching hospitals were presented. The studies were situated in low-middle income, high-middle income, and high-income countries, defined by [27].

**Synthesized finding 1- Barriers to healthy eating**

This synthesized finding contains four categories:

1. **Organizational barriers to healthy eating**

Nurses those who worked night shifts and long working hours found it difficult to stick on a healthy diet [23]. They preferred to eat in large quantities, when they get chance to take a break during long duty hours because they did not know when they will have the opportunity to eat again [23]. The nurses’ preferences of food during night shift are intake of snacks which have high-energy such as chocolate and crisps [23] due to the limited time and short breaks nurses commonly used high-caloric foods during the busy workflows because cafeterias are opened for a limited time-period then the only option is to eat junk from the vending machines [20].

The calories increased because of the intake of sweet foods like; canned coke and lots of chocolate – which keeps them awake and helps prevent tiredness [19, 24]. Inexperienced nurses also preferred more caffeinated drink such as a coffee during night shifts to help with fatigue [24]. This shows that working on shift duty altered the diet patterns and food preferences of nurses [24]. Nurses provided information as they felt that “I don't get any breaks, […] we have to eat handy snacks on the go or forget about eating until after handover, that is not helpful” [21] p.12).

2. **Personal barriers**

Job stress was associated to emotional eating, the desire to eat chocolate, candy and fast food that contains high-fat and high-sugar [23]. Additionally, participants in another study reported that they difficulties in adopting a healthy eating behaviour as shift work made them exhausted [25].While in tense situations, they tend to eat something sweet because they believed it made them feel better. Thus, this mindset disrupted their eating habits and prompted them in continue eating unhealthy food [25]. Nurses’ role and responsibilities decreases the individual’s control on their dietary habits; nurses reported that snacks like chips in their pockets was a convenient and quicker choice of food – while running or moving during work and easily being able to continue their patient’s task [20]. Furthermore, nurses skipping meals made them feel fatigue and enhanced their hunger leading them to desire eating food in large quantities [24]. Nurses in Nigeria also expressed their thoughts that they did not make any strategy for cooking so easy way to have fast foods [21].

3. **Workplace social barriers**

Unhealthy eating behaviour was being influenced from the patients’ family as they commonly gave candies, and fellow workers bringing unhealthy food in a workplace [25]. Supporting this fact, another study reported that generally cake or cookies are the junk foods, donated by patient and relatives which normally consumed by nurses when they are hungry and tired [2]. Additionally, free food was also offered by leaders as an encouragement, gift and for celebrations and even as a bribe to attend meetings [20]. A nurse clearly described the influence of free food on there their health eating habits [20].

4. **Workplace physical environment**

Nurses reported about the easily accessibility unhealthy food in departments that “You can’t avoid the eating during the shift, because the nursing station is full of chocolate” [23], p.274). The rules and regulations in the work environment, food environment of the workplace, insufficient breaks, shift work patterns. In the UK, nurses have faced expenses of canteen which greatly impacted their choices of them continuing to consume healthy food. Healthy food being available are limited in a hospital, as a result, foods such as chips or burgers are the only option left for the night shift nurses [25]. Occupational stress was reported by day and night shift nurses also they identified that canteen had only unhealthy foods such as chips and coke and no bowl of fruit. The canteen should be contain healthy foods only [22].

**Synthesized finding 2- Facilitators to healthy eating**

This synthesized finding contains three categories:

1. **Organizational facilitators to healthy eating**
The future strategies to promote health should start by conducting programs in the workplace which can change the workplace culture positively. Most importantly this change should come from the management for the staff, such as; promoting a healthy culture and encouraging the staff by assigning them a task within their department related to implementing healthy eating practices [23].

The healthy eating practices occur when all the unit staff make efforts to eat healthy diet and others will leads the same habit in the unit [19]. Hospitals should initiate programs regarding wellness, healthy lifestyle, and nutrition and encouraging their cafeterias to provide healthy food choices. Moreover, supporting nurses by instructing them about healthy eating behaviours might affect their eating practices positively. Designed eating programs, particularly for night shift nurses it can also improve nurses dietary habits [2]. Furthermore, one of the key interventions for healthy eating is that hospital leaders help in giving importance to the nurses’ health by motivating them by offering non-food related things, offering wellness programs, educating in terms of healthy nutrition, such as “recipes for quick, healthy meals/snacks, and sell healthy packed to-go meals 24/7” [20, p.382].

2. Personal facilitators

Self-monitoring could be a beneficial strategy to promote health related programs in a workplace [23], establishing goals to encourage healthy eating was found being a possible and an appropriate strategy by writing goals, it reminded the nurses to follow and achieve them, to reward themselves with a healthy lifestyle in return [23]. These goals emphasize nurses to continue following healthy eating behaviour to be able to lose weight (for specific occasions including Christmas and wanting to look good for their spouses) [25]. Another, personal facilitator identified by the nurses was that of being aware about the eating practices, which is beneficial as the understandings of what is necessary for a healthy eating behaviour motivates nurses about what they know and encourages them to follow the same healthy practices [25]. Personal motivator by nurses was involving themselves into healthy eating habit rather than snack which is fast foods, and this will direct them to continue this practice [21].

3. Workplace social facilitators

Social support would be a great strategy for health promotion programs in a workplace. This will happen when hospital ward or nurses’ group make commitment to achieve the goal by reducing the consuming rate of unhealthy foods, during shift duties [23]. The co-worker is the best example to encourage good habits as nurses of National Institutes of Health Clinical Center reported that [26].

Discussion

This systematic review identified the factors which can influence the nurses’ healthy eating practices in the workplace. Personal attribute, physical workplace environment and organizational barriers have been identified as the main barriers that, especially altered the dietary patterns of the nurses. Nurses consumed far more energy by eating chocolates and other junk foods, therefore their Body Mass Index (BMI) increased.

Nurses during night shift, increases the number of snack intakes, which in result, increases their BMI causing them to be overweight and obese [28]. High carbohydrate and fat consumption such as cake, potato chips and biscuits are commonly taken by rotating shift working nurses as compared to day shift nurses [29]. It was identified that stress is the major cause for nurses who are working night shifts to consume a high fat and sugary foods during their shifts [28]. In addition, nurses drink more caffeinated drinks like coffee and tea to make them feel alert and awake during the shift. In accordance with the present results, previous studies have demonstrated that Night shift nurses prefer fast foods (rich in calories) as they want to overcome their fatigue, thus, consuming an insufficient amount of fruit and vegetables [30]. This review also highlighted that during the long duty hours the nurse’s intake fast food increased, this altered their eating attitude. This finding is consistent with study of [8] which found that nurses who were on night duties had an increased percentage (53%) of abnormal restrained eating than those working day shifts. Hence, this due to eating more junk food and consuming less fruits and vegetables, furthermore, because of the high stress levels, nurses were having 52% higher abnormal restrained eating, leading to the intake of unhealthy diet.

This review pointed out that job stress can lead to emotional eating which disturbs the nurses’ eating habits. The work of nurses generally leads to occupational stressors, high workload and shift work being two of them. These stressors make the unhealthy eating practices much worse amongst nurses [31]. Occupational stress decreased the mindful eating scale – that is measured by, having a control on eating habits, concentrating and being discipline while eating, and being mindful [32]. Allowing proper breaks help in improving the eating behaviours, because nurses take breaks hurriedly, which disrupts their eating habits – they filled their pockets with chips for convenient eating [33]. Moreover, skipping meal was commonly observed among nurses which made them feel fatigue and hungrier – resulting them to intake too much food. A study found that, increased consumption of fast food by nurses; was due to, skipping meals, physical and mental tiredness especially during night shifts [30].

This review identified many environmental factors can affect the nurses on dietary intake, such as convenience, amount of purchase, quality and promoting the types of foods (either healthy or unhealthy) [34]. Therefore, this is a normal routine in the hospitals that canteens are closed at night encourage nurses rely on vending machines or food from outside the hospitals such as pizza [29]. These finding consistent in the study of [31] reported through a case study that nurse avail high fatty foods from vending machines such as biscuits, due to insufficient breaks, unavailability of hospital prepared food and unsuitable opening time of canteen that environmental factor interrupt the healthy eating habits of nurses.

The social factors including free food in the form of unhealthy foods from management for motivations, bribes to attend meeting, celebrating special occasions or festivals were another factor to increase the unhealthy eating habits among nurses. Patients’ relatives appreciate the nurses work by giving candies, also the colleagues bringing unhealthy food making the nurses unable to refuse their offers. This finding consistent with the study of [35] that found nurses facing difficulty while their colleagues brought unhealthy foods in workplace environment, this type of culture where providing and having unhealthy diet in the unit makes the hindrance in healthy eating practices.
Furthermore, this review draws special attention to facilitators of healthy eating among nurses. The previous literature reviews on this topic [14] highlighted the personal facilitators to improve the healthy eating habits among nurses. In this review, self-monitoring is found as one of the personal facilitators which was not identified in the previous reviews literatures. Self-monitoring by reflecting ones unhealthy habits and turning them into achievable goals to practice healthy eating during long working hours – the goals would be effective when there will be a reason motivating the nurses to accomplish them (such as weight loss for certain occasions or festivals). Provoking nurses to sustain healthy eating practices by educating them about healthy eating behaviours that would be beneficial for them in the long run. Improving social environment through social support, such as, nurses and their co-workers bringing healthy food, allowing each other to monitor their healthy lifestyle practices together in a healthcare department. Similarly in the study of [12] provided the examples of facilitators such as encouragement of healthy food from co-workers, constructive feedback, delightful mood in workplace, self-efficacy about the advantages of healthy diet, and practicing self-monitoring through pedometers and mobile apps that keeps records of nutrition intake.

This review also highlighted another factors such as organizational, and social facilitators. Providing a positive workplace environment, will promote healthy lifestyle through the reinforcement of healthy eating practice in each departments/unit of healthcare and encouraging the nurses complimenting each other on weight loss [13]. Managers or leaders should lead and arrange wellness programs/sessions [10] such as mindful eating practices to create awareness about nutritious food [32, 36, 37], teach quick healthy dietary recipes to nurses, offering non-food items to nurses for appreciation, meetings, meanwhile and, making healthy food choices available and affordable in hospital cafeteria [12,13].

The culture of a unit is that each time, they celebrate occasions with treats rich in sugar and fat, however, leaders can turn this unhealthy culture into a positive one by providing healthy meals, a tray full of fruits or by giving flowers [7]. One study reported that the reduction in the cost of fruits and salad was up to 50% in healthcare sectors, was seen which will highlight the need for more healthy eating program [34]. Introducing healthy eating programs in the cafeteria has influenced the diet quality of staffs, as the food rich in calories (unhealthy fat and sugar) being purchased was lowered [33].

**Study Strengths and Limitations**

This review followed the standardized JBI critical appraisal instrument for qualitative studies by the involvement of more than one reviewer. The meta-aggregation synthesis supported the result through categorization that found clear interpretation of findings. In addition, in this review the studies findings were reinforced by current literatures. Further research is required to explore the studies through quantitative evidence which would help to integrate the findings with mixed method and could find more evidences on social facilitators to healthy eating.

**Conclusion**

This systematic review provides the facilitators and factors of healthy eating among nurses in a workplace. The review’s results show a clear direction to organizational, personal, environmental, and social barriers and facilitators for implementing healthy eating behaviour in a workplace.

**Implications for clinical practice**

Based on the review finding it highly recommended that all leaders and managers provide positive workplace culture through motivating the nurses to follow a healthy diet by providing healthy, accessible, and affordable food for the nurses in the canteen. The best recommendation is creating awareness among the nurses regarding healthy nutrition to prevent them from becoming obese and overweight. Further, urging them to set goals to attain healthy diet patterns during work – especially for night shift nurses. Moreover, teaching them about mindful eating practices and scheduling proper breaks for them to be able to approach a healthy diet. This review findings helps the managements to develop healthy lifestyles for nurses and promote healthy eating behaviours among nurses in the clinical sitting.

**Declarations**

**Ethics approval and consent to participate:** NA

**Consent for publication:** NA

**Availability of data and materials:** NA

**Competing interests:** No conflict of interest has been declared by the authors.

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**Authors’ contributions:** All authors provided critical feedback and helped the systematic review search, screening, critical appraisal, analysis and writing the manuscript.

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**Conflict of interest**

No conflict of interest has been declared by the authors.
References


Availability of Data and Materials: All data generated or analysed during this study are included in this published article [and its supplementary information files].


Tables

Table 1: Search terms per Database
Q1. Is there congruity between the stated philosophical perspective and the research methodology? Q2. Is there congruity between the research methodology and the research question or objectives? Q3. Is there congruity between the research methodology and the methods used to collect data? Q4. Is there congruity between the research methodology and the representation and analysis of data? Q5. Is there congruity between the research methodology and the interpretation of results? Q6. Is there a statement locating the researcher culturally or theoretically? Q7. Is the influence of the researcher on the research, and vice-versa, addressed? Q8. Are participants, and their voices, adequately represented? Q9. Is the research ethical according to current criteria or, for recent studies, and is there evidence of ethical approval by an appropriate body? Q10. Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?
Table 3: Characteristics of Included Studies
<table>
<thead>
<tr>
<th>Study</th>
<th>Methods for data collection and analysis</th>
<th>Country</th>
<th>Phenomena of interest</th>
<th>Setting/context/culture</th>
<th>Participant characteristics and sample size</th>
<th>Description results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torquati L, Kolbe-Alexander T, Pavey T, Persson C, Leveritt M. 2016.</td>
<td>Focus group (FG) interviews Data analysis through thematic analysis approach</td>
<td>Australia</td>
<td>To explore perceived barriers and enabling factors of a healthy diet in a group of Australian nurses.</td>
<td>3 hospitals from the metropolitan area of Brisbane (QLD).</td>
<td>N = 17 nurses (Registered nurse=13, clinical nurse= 4)</td>
<td>Theme: determinants shift, long hours and Foo</td>
</tr>
<tr>
<td>Monaghan T, Dinour L, Liou D, Shefchik M. 2017.</td>
<td>Interviews (semi-structured questions). Thematic analysis used for analysis</td>
<td>USA</td>
<td>To identify factors influencing hospital nurses’ dietary practices during their shifts through Social Ecological Model (SEM).</td>
<td>Hospital in New Jersey.</td>
<td>N= 20 female nurses experience at least 1 year</td>
<td>Theme: influencing factors</td>
</tr>
<tr>
<td>Ross A, Touchton-Leonard K, Perez A, Wehrlen L, Kazmi N, Gibbons S. 2019.</td>
<td>Online Survey. Inductive (Qualitative) content analysis.</td>
<td>USA</td>
<td>To describe nurses’ perceptions regarding factors that influence their participation in health-promoting behaviors such as exercising, consuming a healthy diet, and participating in stress reduction activities.</td>
<td>National Institutes of Health Clinical Center.</td>
<td>N= 264 (Staff nurse= 103, Research nurse/research coordinator= 82, Manager/administrator, scientist, educator = 52, Advanced practice nurse practitioner, clinical nurse specialist, certified registered nurse anesthetist = 27)</td>
<td>Theme: health-promoting behavior vs unhealthful behaviors; Theme: time/overload; Theme: inadequate facilities; Theme: work environment; Theme: role model</td>
</tr>
<tr>
<td>Horton Dias C, Dawson RM. 2020.</td>
<td>Semi-structured interview or focus group guide with open-ended questions based on the Theoretical Domains Framework (TDF) domains. Used the thematic analysis approach</td>
<td>USA</td>
<td>To explore hospital shift nurses’ experiences and perceptions of influences on making healthy nutritional choices while at work</td>
<td>7 hospitals in the upstate region of South Carolina.</td>
<td>N= 21 Registered nurses (RNs) full-time, part-time, or as needed(PRN) by a hospital, working 10- to 12-hour shifts</td>
<td>Theme: and restrictions; Theme: to minimize control; Theme: environment; Theme: major barriers to healthy lifestyle.</td>
</tr>
<tr>
<td>Phiri LP, Draper CE, Lambert EV, Kolbe-Alexander TL. 2014.</td>
<td>Focus group discussions (FGDs) and key informant interviews (KIIs).</td>
<td>South Africa</td>
<td>To explore and obtain in-depth information about the nurses’ lifestyle behaviours, health concerns and priorities and barriers to living a healthy lifestyle.</td>
<td>22 public hospitals in the Western Cape Metropole, including three tertiary hospitals, two specialist hospitals, nine district hospitals, four psychiatric hospitals, one regional hospital and one tuberculosis hospital.</td>
<td>N= 93 nurses (N =57 Night shift nurses and N= 36 Day shift nurses)</td>
<td>Theme: the overall environment and lifestyle; Theme: work environment; Theme: promotion program</td>
</tr>
<tr>
<td>Study</td>
<td>Methods for data collection and analysis</td>
<td>Country</td>
<td>Phenomena of interest</td>
<td>Setting/context/culture</td>
<td>Participant characteristics and sample size</td>
<td>Description of main results</td>
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<tr>
<td>Uchendu C, Windle R, Blake H. 2020.</td>
<td>Semi-structured interviews. Data were analyzed using thematic analysis.</td>
<td>Nigeria</td>
<td>To understand and describe the perceived facilitators and barriers to Nigeria nurses' engagement in HPBs based on the socio-ecological model (SEM).</td>
<td>A large sub-urban tertiary health facility.</td>
<td>N = 18 Registered Nurses (N = 3 Nursing officers, N = 4 Principal nursing officer, N = 6 Senior nursing officers, N = 5 Chief nursing officers)</td>
<td>Theme: Intrapersonal Level</td>
</tr>
<tr>
<td>Persson M, Mårtensson J. 2006.</td>
<td>Semistructured interviews. Situations analysed with Critical Incident Technique (CIT) along with systematic categorization.</td>
<td>Sweden</td>
<td>To describe, from the nurses' account, situations/incidents with a significant influence on healthy diet and exercise habits among community nurses working night shift.</td>
<td>A municipality of southwestern.</td>
<td>N = 27 Night work community nurses (N = 25 Enrolled nurses, N = 2 Registered nurses)</td>
<td>Theme: Coping ability at work</td>
</tr>
<tr>
<td>Gifkins J, Johnston A, Loudoun R. 2018.</td>
<td>Semistructured individual interviews with open-ended questions. Thematic analysis was utilized.</td>
<td>Australia</td>
<td>To explore links between shift work and food, drinking and dietary habits and behaviours for experienced and newly graduated nurses.</td>
<td>Private, public hospitals and aged care.</td>
<td>N = 12 Experienced nurses worked from 3 to 47 years in shifts, with an average shift-working life of 20 years. N = 9 Inexperienced nurses recently graduated from nursing colleges and universities and had worked for less than one year in shift work</td>
<td>Theme: Snacking behaviours and craving foods</td>
</tr>
<tr>
<td>Power BT, Kiezebrink K, Allan JL, Campbell MK. 2017.</td>
<td>Semi-structured interviews. Analysed data by inductive coding and deductive coding.</td>
<td>United Kingdom</td>
<td>To systematically explore the most salient determinants of unhealthy eating behaviour in hospital-based nurses with Theoretical Domains Framework; TDF.</td>
<td>Teaching hospital in the North East of Scotland (Aberdeen Royal Infirmary).</td>
<td>N = 16 Registered nurses with a permanent or temporary, part-time, or full-time position. (N = 3 Day shift only and N = 13 Day and Night shift)</td>
<td>Theme: Environmental factors influencing nurses' eating</td>
</tr>
</tbody>
</table>

Subtheme: Environmental context and resources

Subtheme: Interpersonal factors influencing nurses eating

Subtheme: Social influences

Subtheme: Intrapersonal factors influencing nurses' eating

Subtheme: Memory attention and decision processes

Subtheme: Behavioural regulation

Subtheme: Emotion
Table 4a: Barriers to healthy eating
<table>
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<th>Synthesized findings</th>
<th>Categories</th>
<th>Sub themes</th>
<th>Example illustration from each category</th>
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<tbody>
<tr>
<td>Workplace determinants for diet (Night shift)</td>
<td>Organisation barriers to healthy eating</td>
<td>Consumed high-energy snacks, like chocolate and crisps, to help them stay awake during their night shift. “You eat crisps to stay awake all night and coke ... and by the end of the night you feel revolting” (Torquati et al. 2016, p.273).</td>
<td></td>
</tr>
<tr>
<td>Workplace determinants for diet (Long working hours and breaks)</td>
<td>Organisation barriers to healthy eating</td>
<td>They would eat as much as they can given the opportunity to take a break during long shifts... “You don’t know when you will be able to eat again” (Torquati et al. 2016, p.274).</td>
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<td>Shift work is a major barrier to healthy eating</td>
<td>Organisation barriers to healthy eating</td>
<td>Overeating was reported as a common occurrence due to... after lengthy shifts and long periods without food. “If you wait too long to eat, you will overeat, you’ll stress-eat. There tends to be way too many sweets, like candies or stuff that families will bring into you, and you will gorge yourself on that if you are waiting too long to eat, so you shove like 5 fun-size Snickers’ in your mouth” (Horton Dias and Dawson 2020, p.380).</td>
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<tr>
<td>Snacking behaviours and craving foods (Eating on shifts)</td>
<td>Personal barriers</td>
<td>Increased snacking and food craving while at work, predominantly on night shifts. Experienced nurses ... on night shifts, I will eat all during the day, and all during the night, and so I’m actually eating a huge amount more calories than I usually would, and my weight is just all over the place. I drink cans of coke and eat lots of chocolate and stuff because my preparation is terrible, and I rely on those sweet foods to keep awake and help with the fatigue” (Gifkins et al. 2018, p.814).</td>
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<tr>
<td>Snacking behaviours and craving foods (Caffeine consumption on night shifts)</td>
<td>Personal barriers</td>
<td>Increased consumption of coffee and tea by both groups of nurses was mostly associated with night shifts... An inexperienced nurse described drinking more coffee on night shifts. “So often if I am really tired, I will get a caffeinated drink like a coffee” (Gifkins et al. 2018, p.814).</td>
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<td>Coping ability at work (Night staff are influenced by the disruption to the circadian rhythm)</td>
<td>Personal barriers</td>
<td>Eating unhealthy food was sometimes a means of staying awake...”When I’m tired... I often eat sweet things... if I haven't bought sweets then...some nights the craving for sweet things is very strong indeed... then you’ve just got to have something” (Persson and MÄRtensson 2006, p. 418).</td>
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<td>Organizational Level</td>
<td>Personal barriers</td>
<td>All nurses felt...”I don’t get any breaks, [...] we have to eat handy snacks on the go or forget about eating until after handover, that is not helpful” (Uchendu et al. 2020, p.12).</td>
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<td>Barriers to health-promoting Behaviors (No time/overworked)</td>
<td>Personal barriers</td>
<td>“I also don’t always have the time or resources to take a full break and eat the lunch I have prepared, but rather have to snack” (Ross et al. 2019, p.365).</td>
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<td>Personal determinants for diet (Job stress)</td>
<td>Intrapersonal barriers influencing nurses’ eating (Memory attention and decision processes)</td>
<td>Stress was related to emotional eating and craving on high-fat high-sugar food, such as chocolate, candy and fast food... “You have a bad day, and before you know it you have five (chocolates) in your mouth” (Torquati et al. 2016, p.275).</td>
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<td>Distractions such as a desire to be “social” and to “savour” their days off, as making eating behaviour more difficult to achieve... being “exhausted”, “out of sorts” or “knackered” as a result of shift work which subsequently affected their eating behaviour (Power et al. 2017, p.7).</td>
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<tr>
<td>Behavioural regulation (Emotion)</td>
<td>Intrapersonal barriers influencing nurses’ eating (Memory attention and decision processes)</td>
<td>Being “stressed out” inhibited thinking about healthy eating... “You immediately go for something sweet to try and make yourself feel better”...occasions in which their mood hindered their eating behaviour and influenced them to “eat junk” (Power et al. 2017, p.7).</td>
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<td>Quick” foods and snacks were typical choices during work shifts...</td>
<td>Individual influences</td>
<td>“Quick” foods and snacks were typical choices during work shifts... Taking a break affected their eating habits, 85% of the respondents said yes, 75% attributed taking an allotted break to better eating habits. Nurse responded, “If I actually do take a break and sit down, then I'm more likely to eat something more substantial” (Monaghan et al. 2018, p.335).</td>
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<tr>
<td>Nursing role and responsibilities restrict freedom of movement and minimize individual control over dietary practices</td>
<td>Individual influences</td>
<td>“Whatever I can put in my mouth when I am walking or running or moving, it has to be convenient, so most things that are convenient aren’t really healthy...I can stick a bag of chips in my pocket, or a pack of cookies in my pocket that I can snack on when I’m running around”... “you’re eating junk food instead of the salad you made for yourself, because it’s quicker and you can get back to your patients” (Horton Dias and Dawson 2020, p.379).</td>
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<td>Skipping meals was detrimental to their health and well-being...</td>
<td>Intrapersonal Level</td>
<td>“I don’t plan, no plans for exercising and to cook too so I survive on snacks or fast foods” (Uchendu et al. 2020, p.8).</td>
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<tr>
<td>Barriers to healthy eating</td>
<td>Workplace physical environment</td>
<td>Workplace determinants for diet (Food availability)</td>
<td>Environmental factors influencing nurses’ eating (Environmental context and resources)</td>
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<td>Workplace social barriers</td>
<td>Interpersonal factors influencing nurses eating (Social influences)</td>
<td>Family as key influencers of unhealthy eating... the family of patients were also cited as posing difficulty to nurses' eating behaviour (Power et al. 2017, p.5). “Sweeties constantly being given by relatives” ... work colleagues bringing unhealthy food into work (Power et al. 2017, p.6).</td>
<td>“The typical food that’s offered in the break room are usually stuff like cake or cookies or candy. And you get the word—oh such and such family brought cake in and you run in and grab it and you’re on your way.” “Yeah, that’s a lot of patient and family donated food. It’s always garbage.” “You know, people bring food and it’s usually junk like cookies which of course is very appealing when you’re starving and exhausted.” “There is donated food and I’ll usually eat it” (Monaghan et al. 2018, p.337).</td>
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behaviors (Lack of adequate facilities/resources) food... No healthy food available during the night shift. All choices high in salt, fat, cholesterol, sugar, etc. . . . “ (Ross et al. 2019, p.365).

<table>
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<th>Table 4b: Facilitators to healthy eating</th>
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<td><strong>Workplace social facilitators</strong></td>
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<tr>
<td>Individuals who influence health promoting behaviors (Positive vs. negative role models)</td>
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Figure 1: PRISMA flow diagram of the systematic review process

Records identified from Database (n = 339)

Duplicate records removed (n = 28)
Records after duplicates removed (n = 311)

Records screened (title and abstract) (n = 311)

Records excluded (n = 310)

Records sought for retrieval (n = 18)

Full-text articles assessed for eligibility (n = 9)

Full-text articles excluded, with reasons (n = 9):
1. Articles based on Case study (n = 2)
2. Not a primary data source (n = 2)
3. No barriers and facilitators of healthy eating (n = 2)
4. Only Quantitative studies (n = 2)
5. Only Students (n = 1)

Studies included in review (n = 9)

Studies included in qualitative synthesis (n = 9)

Figure 1
See image above for figure legend.
Figure 2

Barriers to Healthy Eating
Figure 3
Facilitators to Healthy Eating

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- TableS1Appraisal.docx
- TableS2ExcludedStudies.docx